DECEMBER, 1947

# Railway Engineering and Maintenance

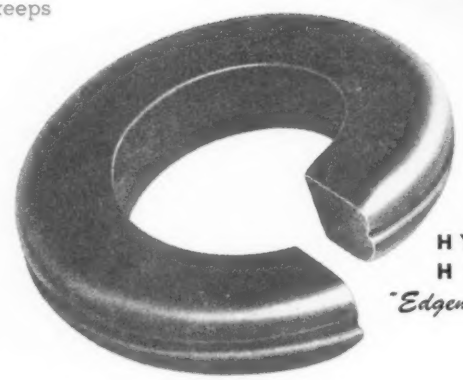
NATIONAL LOCK WASHER COMPANY, NEWARK, 5, N. J., U. S. A.

# CHRISTMAS *and* TRAINS GO TOGETHER!

PHOTO COURTESY THE LIONEL CORPORATION

Railroading is always close to the hearts of American boys and men. In the glow of Christmas, when families gather for fun and feast, the toy railroad is a center of interest for young and old. For railroads are an exciting, romantic part of our civilization. Their history is the history of the nation. Their work keeps millions on farms, in factories, offices . . . everywhere . . . busy.

Let's encourage model railroaders. Their pastime interest may well lead to a lifetime loyalty in railroad work.



HY-PRESSURE
HY-CROME
*"Edgemark of Quality"*

**EATON**
**EATON MANUFACTURING COMPANY**

*Reliance Division*

MASSILLON, OHIO

***Sales Offices:*** **New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal**

# SIMPLE POWERFUL SAFE

**NO COMPLICATED PARTS**
**NO BOTHERSOME**
**MAINTENANCE PROBLEMS**

Bethlehem's 1222 is one of the simplest yet most effective switch stands ever devised.

A parallel-throw, gearless-type stand, it works on the sliding-block and crank principle. Its very simplicity makes for trouble-free operation. As the lever is raised, the sliding block causes the crank to turn, and the switch-throwing force is transmitted through the connecting and switch rods. That's all there is to it.

Another great advantage of the 1222 is its flatness. Even when fully exposed, it presents little vertical surface to catch or snag dragging equipment. Moreover, this compactness makes it an ideal stand for use between rails or in other confined locations.

Many railroads have adopted this powerful little switch stand for yard work and certain types of main-line service. It is designed for use with rail above the 60-lb class. For more details, ask a Bethlehem man to spend a few minutes with you.

When used without target, the 1222 stands only about 5 inches above level of ties.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**

***On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation***

★ BETHLEHEM STEEL ★



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# HOW *Weatherproofing** PROTECTS RAILROAD PROPERTIES

*A specialized service of the Western Waterproofing Companies—preserving buildings through an understanding of natural forces and the proper use of correct materials and methods.

CASE HISTORY R 106

## TUNNELS

CLIENT: Central of Georgia Railway Co.

PROJECT: 2630' COOSA TUNNEL near Leeds, Alabama

PROBLEM: Originally lined with ... it with brick for 204 ... of it was dry, but a ... heavily wet. Corro... stating repeate...

CASE HISTORY R 449

## TERMINALS

CLIENT: St. Louis-San Francisco R.R.

PROJECT: Tulsa Union Depot

PROBLEM: To restore depot to origi...

SOLUTION: After a thorou... and weather...

For Below-Grade
**WATERPROOFING**
"Ironite"
TRADEMARK

For Above-Grade
**WEATHERPROOFING**
"Resto-Crete"
TRADEMARK

*These materials are applied exclusively by the Western Companies and are not for sale. Jobs done under contract, force or set fee, insured and guaranteed.*

Tunnels, terminals, grain elevators, locomotive shops, office buildings and other railroad properties can be protected and preserved through proper remedial restoration and protective maintenance. Natural physical deterioration—indicated by loose mortar joints, cracking walls, and moisture seepage—can be effectively resisted to save your road thousands of wasted dollars.

Such loss can be stopped at its source. Many years of usefulness can be added to your property by employing the weatherproofing know-how of Western engineers and technicians. Proven materials and methods . . . plus experience gained by solving property maintenance problems for many of the nation's leading railroads—can give your buildings effective and decorative weather-resistant protection. The cost will be only a fraction of a structure's value. Satisfaction is guaranteed when you specify Western.

The nearest office will gladly furnish a list of railroad references. Write today for further information and a preliminary survey of your property. There's no obligation.

**WESTERN**
**WATERPROOFING COMPANIES**
*Engineers and Contractors*

★ BOSTON
★ CINCINNATI
Dayton, Ohio
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Montreal, Que.
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Washington, D. C.
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Springfield, Ill.
Charlotte, N. C.
Atlanta, Ga.
★ CHICAGO
CENTRAL IRONITE Waterproofing Company

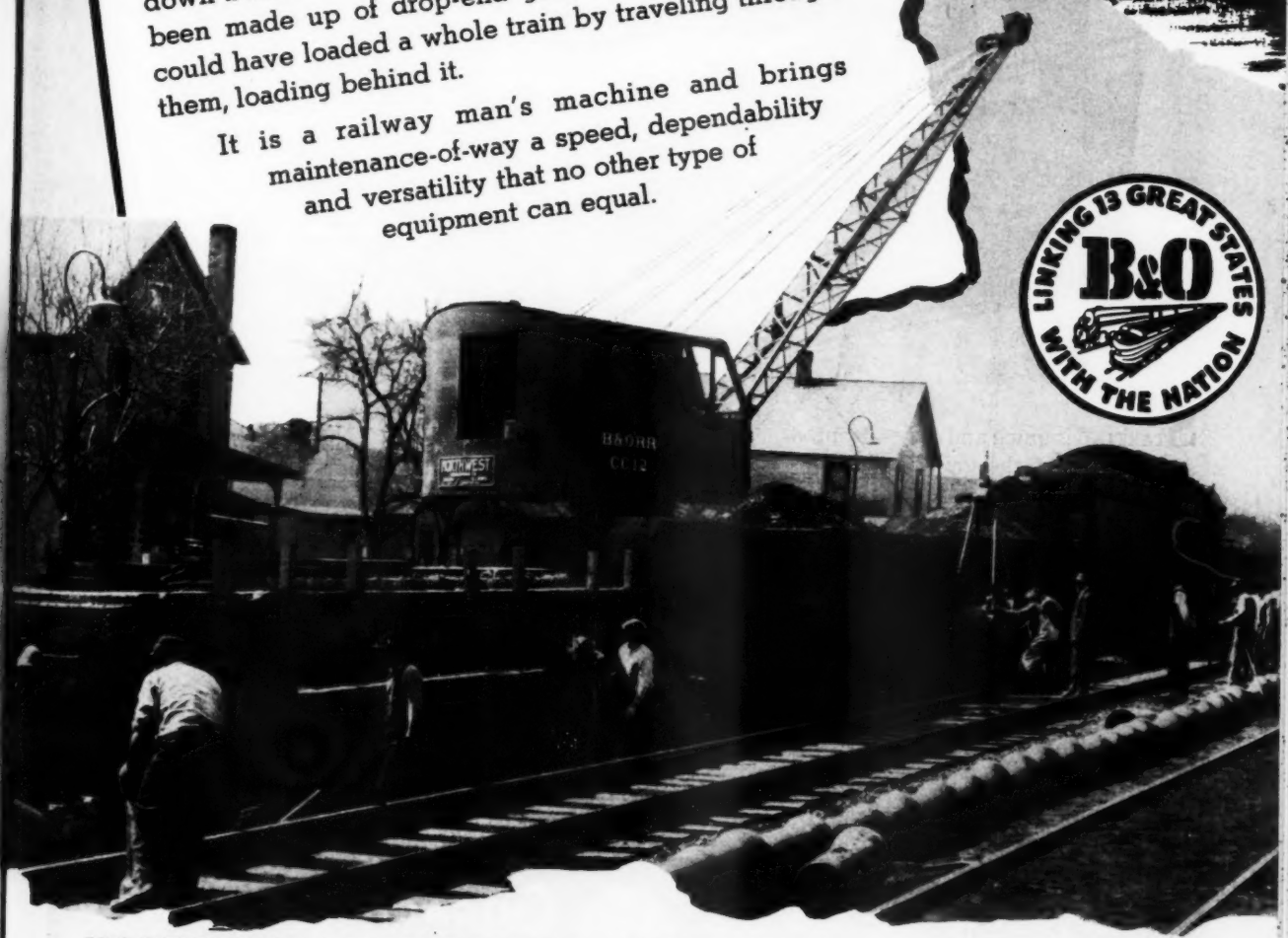
# The B & O does it the EASY WAY!

HERE was a job that could be done several different ways. But, only a Crawler Crane could do work like this *from the car* and then take over on a job on the ground or on work completely off the line.

The B & O did it the easy way. The Northwest is quickly loaded on a standard flatcar. It is smoothly, safely and *positively* handled through the "Feather-Touch" Clutch Control. A Northwest can't be shut down because of control failure. Had the train, below, been made up of drop-end gondolas the Northwest could have loaded a whole train by traveling through them, loading behind it.

It is a railway man's machine and brings maintenance-of-way a speed, dependability and versatility that no other type of equipment can equal.

LINKING 13 GREAT STATES B&O WITH THE NATION



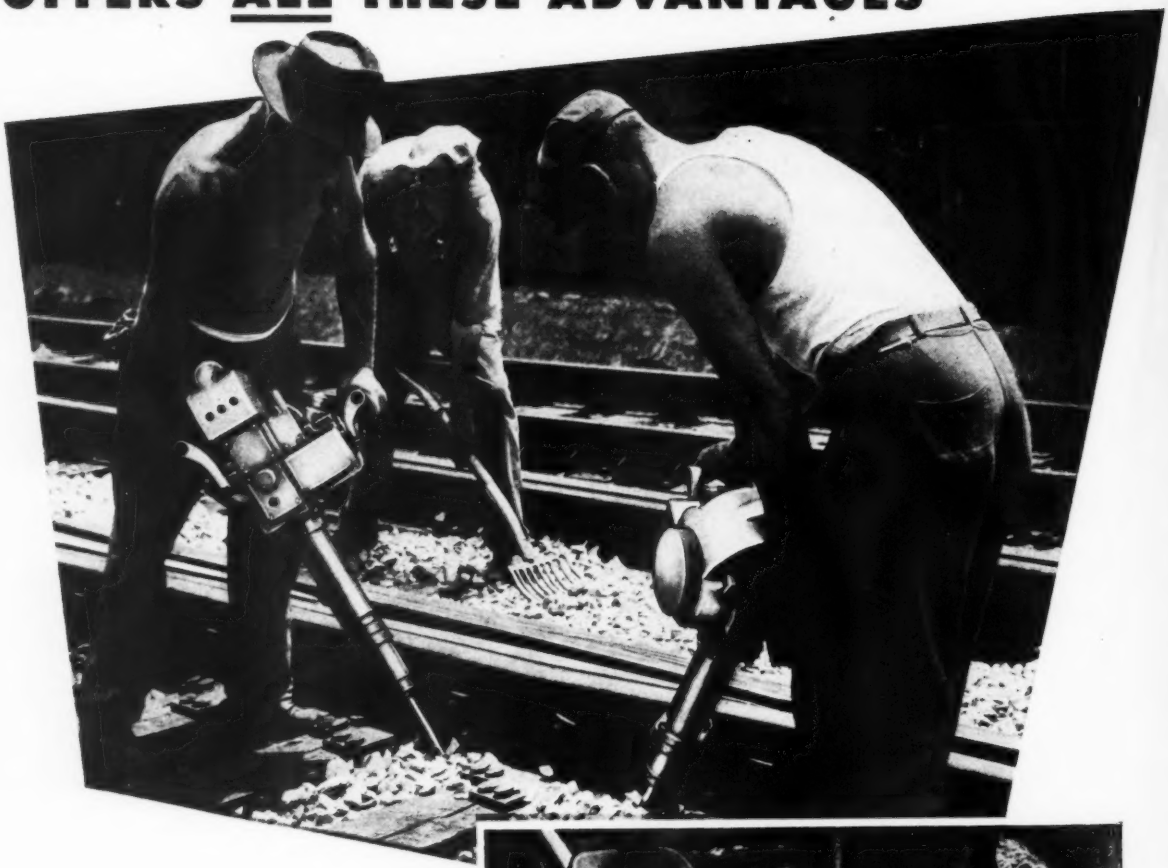

NORTHWEST ENGINEERING COMPANY
1513 Field Bldg., 135 South LaSalle St., Chicago 3, Ill.

# NORTHWEST

Proved on the Nation's Leading Railways

*The all purpose Railroad Machine* • SHOVEL • CRANE • DRAGLINE • PULLSHOVEL

# CP-5 GASOLINE TIE TAMPER OFFERS ALL THESE ADVANTAGES



STARTING is quick and easy – by pressure on one of the grip handles.

Balance is perfect – weight is centered between grip handles.

View of work is unobstructed, because of compact engine design and slender contour of lower end of tool.

Vibration is minimized in grip handles by air-cushioning of return stroke of free-throw striking piston – machine life is prolonged.

Magneto provides efficient ignition system under all conditions – there are no batteries, thus eliminating costly battery replacements.

Standard two-cycle engine operates on gasoline-oil fuel mixture – oil in fuel provides automatic lubrication.

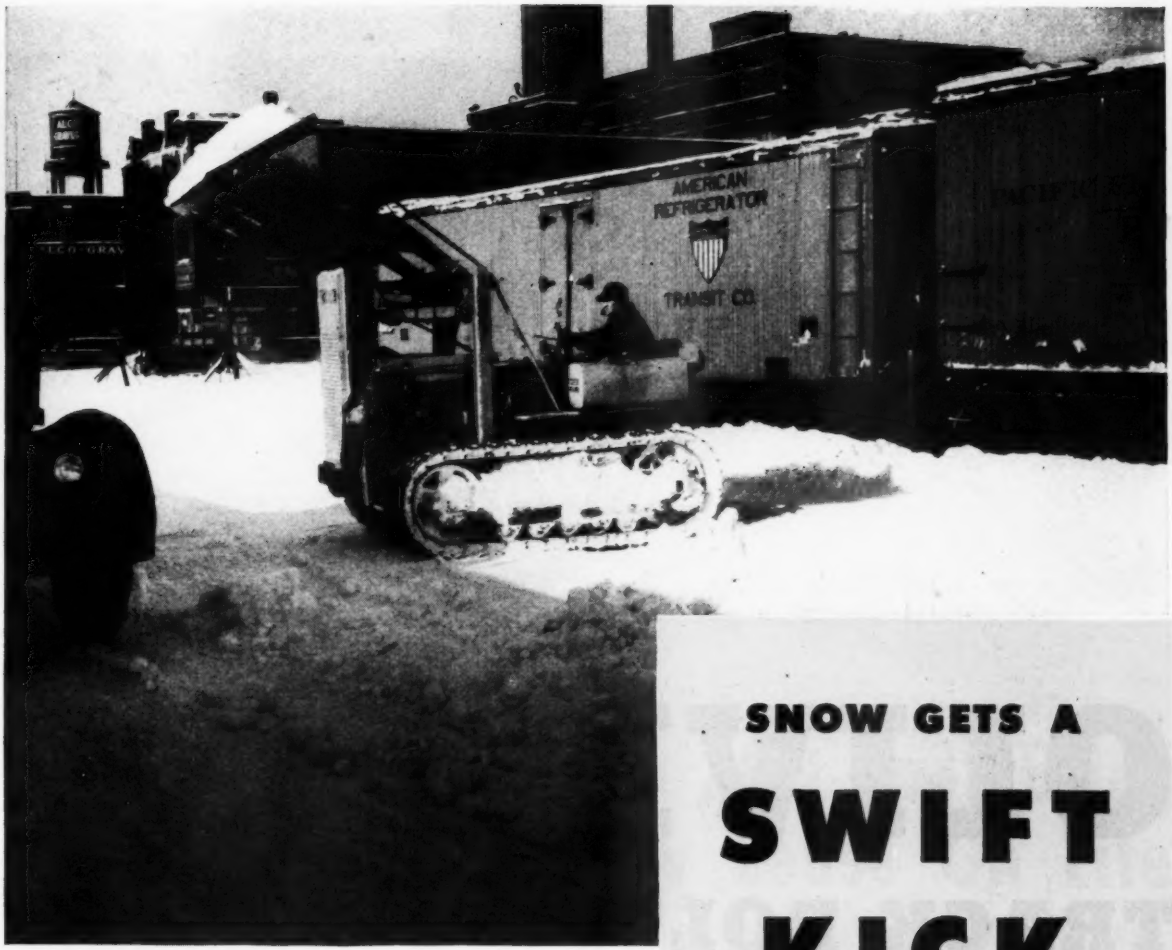
Write for Bulletin 1943 – Maintenance-of-Way Equipment.

*Slender contour permits close quarters tamping in frog switches.*

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES




# SNOW GETS A SWIFT KICK

Snow is a tough customer for the railroads. It bogs down efficient yard operation, chokes off the right-of-way—ties everything up in an icy-white knot.

There are ways to lick the problem, though. In Chicago & Northwestern's home-town potato yards, for example, two "Caterpillar" Diesel D4 Tractors take a real load off the road's shoulders. One D4, with a 'dozer, piles the snow up. The other, equipped with a Traxcavator, follows behind and loads the snow into trucks. Result: quick, economical solution of a tie-up that can cost the road lots of money.

The same "Caterpillar" units are useful and dependable on many other jobs, regardless of season. For maintenance-of-way work in summer, they can be loaded onto flat cars and rushed to any spot on the line when needed.

This is another case where "Caterpillar" Diesel equipment has meant substantial year-round savings to the railroads who use it.

**CATERPILLAR**
**DIESEL** ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

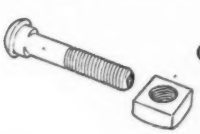
**CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS**

# OLIVER

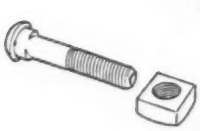
## TRACK BOLTS

your best choice—because

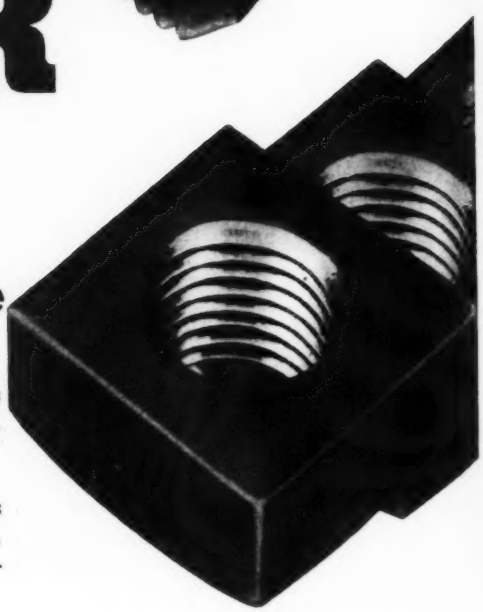
Double Heat Treatment adds strength to Oliver Track Bolts.



Clean, accurate threads mean faster assembly, speedier maintenance.



Dependable uniformity of Oliver Track Bolts means more uniform, higher strength joints.



OLIVER
IRON AND STEEL
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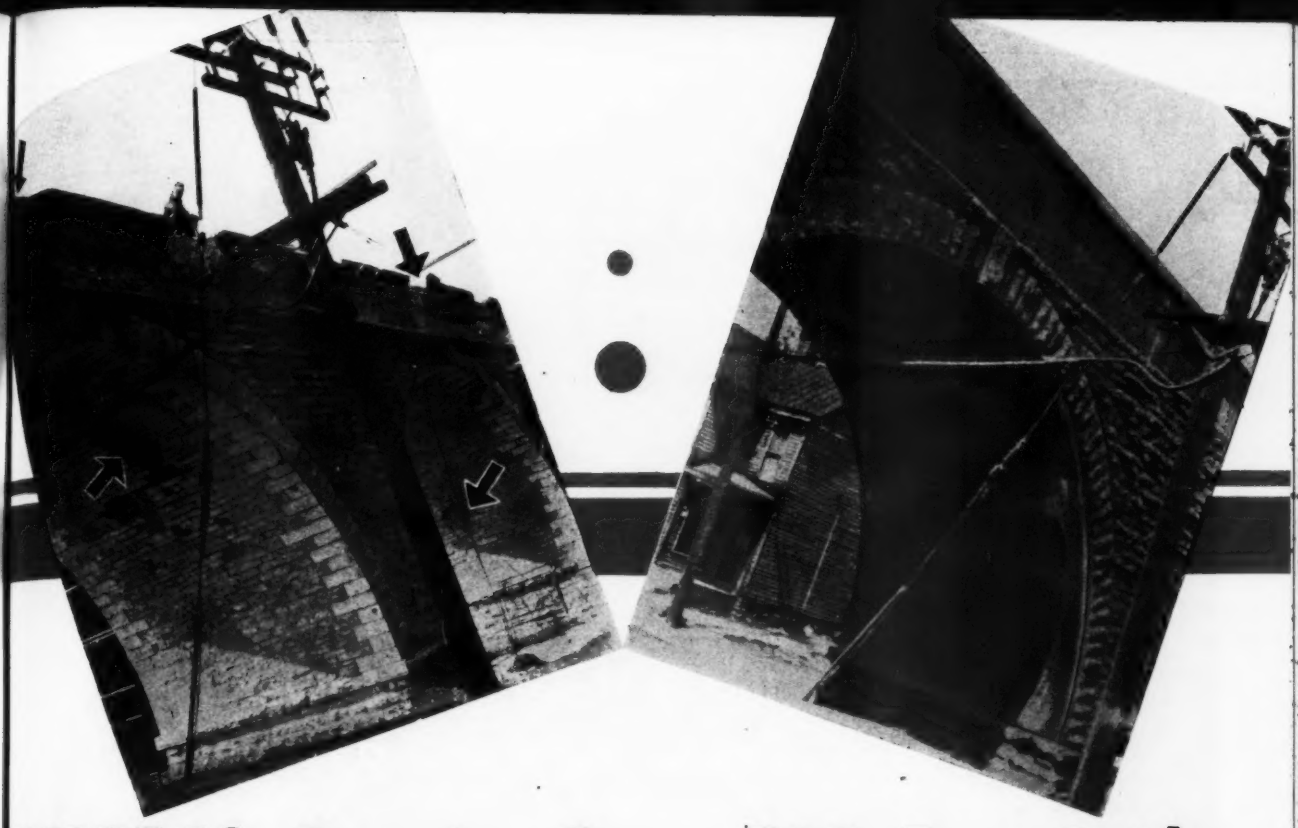
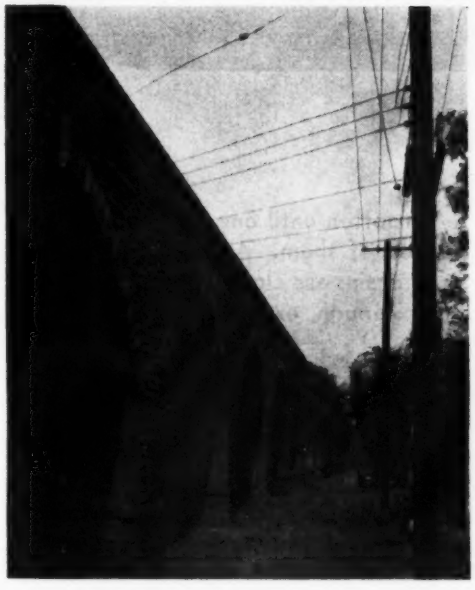


# EMBECO Repairs Gave 700 Foot Bridge "New Lease On Life"



Non-Shrink Embeco used throughout in repairs on this 700 foot railroad bridge in Hamilton, Ohio. Disintegrated concrete in parapets cut out and replaced with gunite; sides and top of arches pressure grouted; arches lined with 2" gunite; balance of stone work tuckpointed. After two years heavy vibration from down-grade braking of trains, repairs are in excellent condition. One of many Embeco repair jobs done by George E. Detzel Co., Cincinnati, Ohio, Restoration Contractors.

Railway properties, such as this 17 arch bridge, are being brought up to the requirements for safe, adequate and modernized transportation by the Embeco Non-Shrink Method.

Eliminating all shrinkage in mortar and grout, Embeco is used widely and successfully for grouting bridge, turntable and heavy machinery bed plates, repointing old stone structures, reintegration of concrete masonry piers and abutments and the application of gunned concrete for tunnel lining, repairing retaining walls, dams, abutments and piers.

Fill in and mail coupon below for full information on the Embeco Non-Shrink Method.

THE MASTER BUILDERS CO.
7016 Euclid Ave., Cleveland 3, Ohio

Please send me full information on the Embeco Non-Shrink Method for concrete reintegration and grouting.

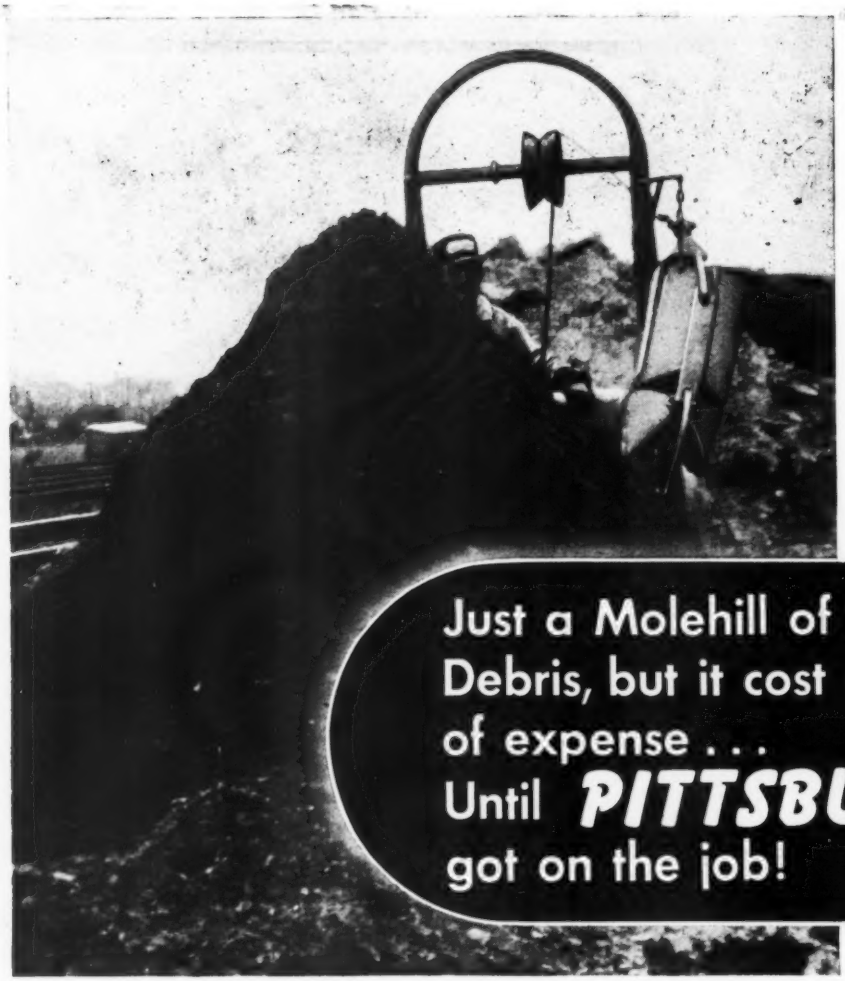
Name.....

Company.....

Address.....

the MASTER BUILDERS Co

CLEVELAND 3, OHIO TORONTO, ONTARIO



# Just a Molehill of Sewer Debris, but it cost a mountain of expense . . . Until PITTSBURGH got on the job!

**OTHER PITTSBURGH SERVICES INCLUDE:**

**Hydraulic and mechanical cleaning of water mains . . . penstocks . . . risers . . . laterals . . . gas lines . . . fuel pipes. Water main pipe lining by the Pittsburgh-Eric process to retard incrustation and tuberculation.**

SEWERS are apt to be forgotten until one day something happens to remind you of them. A freshet, for instance! Then if sewers and drains are clogged and cannot carry off the water fast enough, expensive damage can result!

So protect your yards and shops against disabling and expensive floods by *remembering* your sewers . . . and see that they are kept clean and free-flowing. The best way to do this is through the unique facilities and experience of Pittsburgh Pipe Cleaner Company. Using the newest and most efficient tools and equipment, we can restore your sewers to full capacity with minimum expense and least disruption of service. Ask our nearest office for full details today!

## PITTSBURGH PIPE CLEANER COMPANY

**133 Dahlem St., Pittsburgh 6, Pa.**

PHILADELPHIA · BALTIMORE · WASHINGTON · NEW YORK · BUFFALO · CHICAGO · CINCINNATI · ST. LOUIS · DETROIT · BOSTON

# TIMKEN® BEARINGS KEEP 'EM ROLLING!

Fairbanks-Morse No. 53 motor car equipped with Timken Bearings on all axles.

TIMKEN BEARING EQUIPPED

Increased availability for service is one of the principal reasons why so many main line locomotives, cars and streamlined trains are equipped with Timken Roller Bearings and why so many more are constantly going on Timkens.

That's likewise a good reason why railroad section cars should have Timken Bearings — and why the majority of them do.

Contributing to greater availability are: reduced lubrication time; elimination of axle wear; maintenance of correct wheel gauge; radial, thrust and combined load capacity; greater endurance; longer car life.

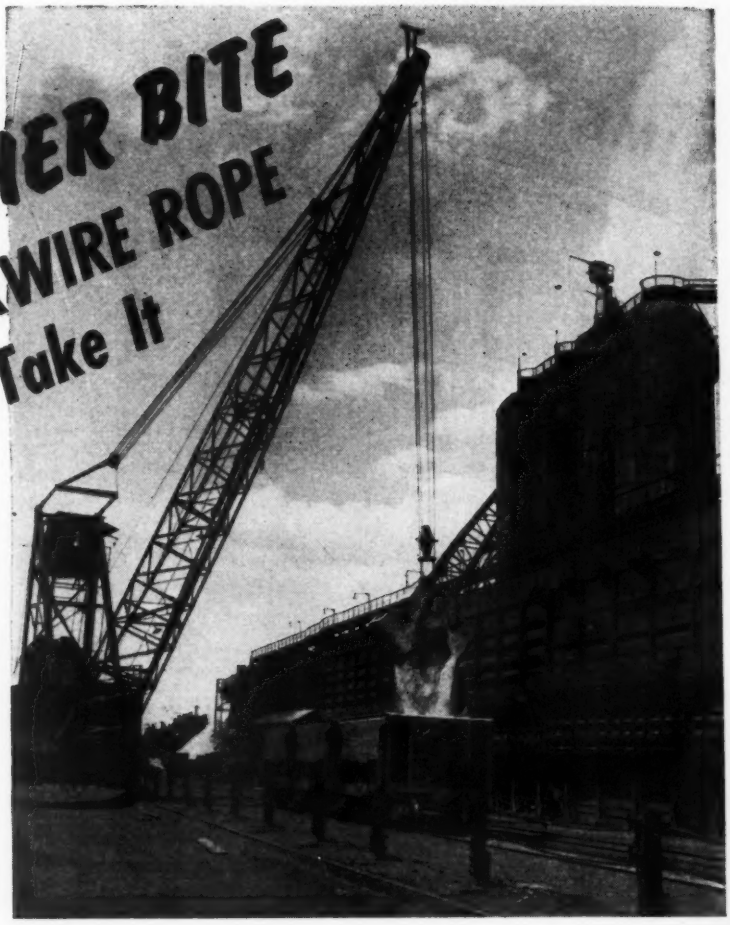
See that you have Timken Bearings in your new cars. Look for the trade-mark "TIMKEN" on every bearing that goes in the section cars you build.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

TIMKEN
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◎ AND THRUST ◎ LOADS OR ANY COMBINATION ◎

# GRAB ANOTHER BITE ...The WICKWIRE ROPE Can Take It



Select a Wickwire rope best suited for each particular application . . . rope for resistance to impact or abrasion or bending fatigue . . . rope which will stand up on the toughest jobs, and give dependable performance under constant, heavy duty service. Our engineers, benefiting by 125 years experience, "know the ropes". We invite your inquiries on your particular wire rope problems.

**Rails, Joints, Tie Plates, Bolts, Spikes, Realock Fence, Woven Wire Fence, Clinton Welded Fabric**
**. . . all Quality Products of CF&I Serving the Railroad needs.**

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***A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION***

**The Colorado Fuel and Iron Corporation**

GENERAL OFFICES: DENVER, COLORADO

IN THE EAST: WICKWIRE SPENCER STEEL DIVISION, PALMER, MASSACHUSETTS
ON THE PACIFIC COAST: CALIFORNIA WIRE CLOTH CORPORATION, OAKLAND 4, CALIF.

## BLACK & DECKER
### 7" "Quick Saw"*
**$115.00**

**Cuts to 2 3/8" Depth**

**Rips • Crosscuts • Dadoes • Angles**
**Grooves—in WOOD • METAL**
**STONE • COMPOSITIONS**

A Black & Decker 7" Electric Quick-Saw is ten times faster than hand sawing. Most popular size for construction, maintenance and repair jobs. Features: quick adjustments for angle or depth of cut, easy-to-change blades and discs for variety of cuts. Operates on any standard power line or portable generator. Powered by a heavy-duty Black & Decker Universal Motor, specially built for tough sawing operations. Fully protected with guards for safe use.

*Trade Mark Reg. U. S. Pat. Off.

# SWITCH from Hand to POWER for FASTER, LOW-COST Sawing and Hammering

## BLACK & DECKER
### 3/4" ELECTRIC HAMMER
**$120.00**

**Drills or channels in brick, stone, concrete • Chips, cleans and scales metal • Gouges, shapes and notches timbers • Drives spikes • Seams and caulks • Tamps and vibrates concrete forms • Scuffs concrete surfaces, removes form marks.**

High-speed, hard-hitting and amazingly husky, yet compact and light in weight, these Hammers are completely self-contained and operate from Standard A.C. or D.C. outlet or portable generator. Deliver thousands of sharp, positive hammer blows per minute.

**ASK YOUR NEARBY** Black & Decker Distributor for complete information on Saws, Hammers, Drills and the many other B & D Portable Electric Tools. Write for free catalog to: The Black & Decker Mfg. Co., 663 Pennsylvania Ave., Towson 4, Maryland.

LEADING DISTRIBUTORS EVERYWHERE SELL

**Black & Decker**
**PORTABLE ELECTRIC TOOLS**

# NEW Rubber-tired
# Your first cross-track

The new high-speed, rubber-tired Tournadozer handles all types of railroad maintenance . . . spreads ballast, "daylights" curves, cleans ditches, backfills around culverts and bridge abutments.

Completes rush jobs fast . . . drives job-to-job at 15 m.p.h. . . . removes slides, fills washouts, straightens tracks . . . reinforces causeways and bridge approaches. Really pays off in emergencies.

Tournadozer gives you 4 speeds forward or reverse, with instantaneous non-stop speed selection . . . enables you to handle sand, gravel, cinders, coal, chemicals, etc., faster and more economically.

Operator rides easy on big low-pressure tires and hydraulic suspension seat . . . air-actuated controls take labor out of operating. No neck-stretching, no clutches to fight . . . no end-of-day slow down.

Tournadozer Trademark REG.

LETOURNEAU EQUIPMENT

**See your LeTourneau Railroad Distributor NOW for complete information**

# TOURNADOZER

## maintenance dozer...

YES, for the first time in history, you have an off-track, rubber-tired dozer that can go anywhere on your right-of-way in a hurry . . . cross tracks at will . . . make fast, job-to-job moves over pavement, black top or cross country.

### *Speeds up to 15 m.p.h. . . . forward and REVERSE*

The 180 h.p. Model C Tournadozer gives you the high speed operation you've always wanted in a dozer — up to 15 m.p.h. forward and reverse — nearly twice as fast as crawlers.

### *No gear-shift delay*

New constant-mesh transmission in the Tournadozer gives you instant selection of gear ratios anytime . . . without loss of momentum, or stopping to shift gears. Move selector lever to speed you want and air-actuated clutches give it to you RIGHT NOW.

Low center of gravity and wide tire tread assure greater stability . . . short-coupled wheelbase increases maneuverability.

### *Doesn't tie up rail traffic or train equipment*

In cleaning drainage ditches, cutting down banks, spreading cinders around yards, roundhouse or riptracks, Tournadozer will not tie up rail traffic . . . big expensive train equipment or special tools are not needed. Reduces equipment investment, requires fewer men.

### *Ample traction . . . less maintenance*

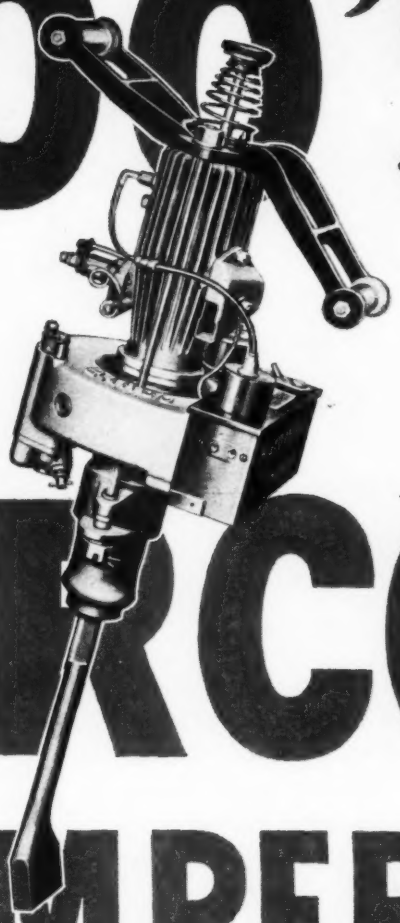
Four big 21:00 x 25 low-pressure tires assure ample flotation and traction for toughest going . . . no track rollers to lubricate . . . no expensive moving parts to grind and wear in abrasive material. You roll on rubber instead of steel.

### *Seeing is believing*

Before you buy a slow-moving, high-maintenance dozer, see the new fast-moving, rubber-tired Model C Tournadozer in action. Your LeTourneau Railroad Distributor can give you complete information on performance, prices and delivery . . . SEE HIM NOW.

**LETOURNEAU** PEORIA, ILLINOIS — HIGH-SPEED RUBBER-TIRED **TOURNADOZERS**

# 1000'S OF BARCO TYTAMPERS



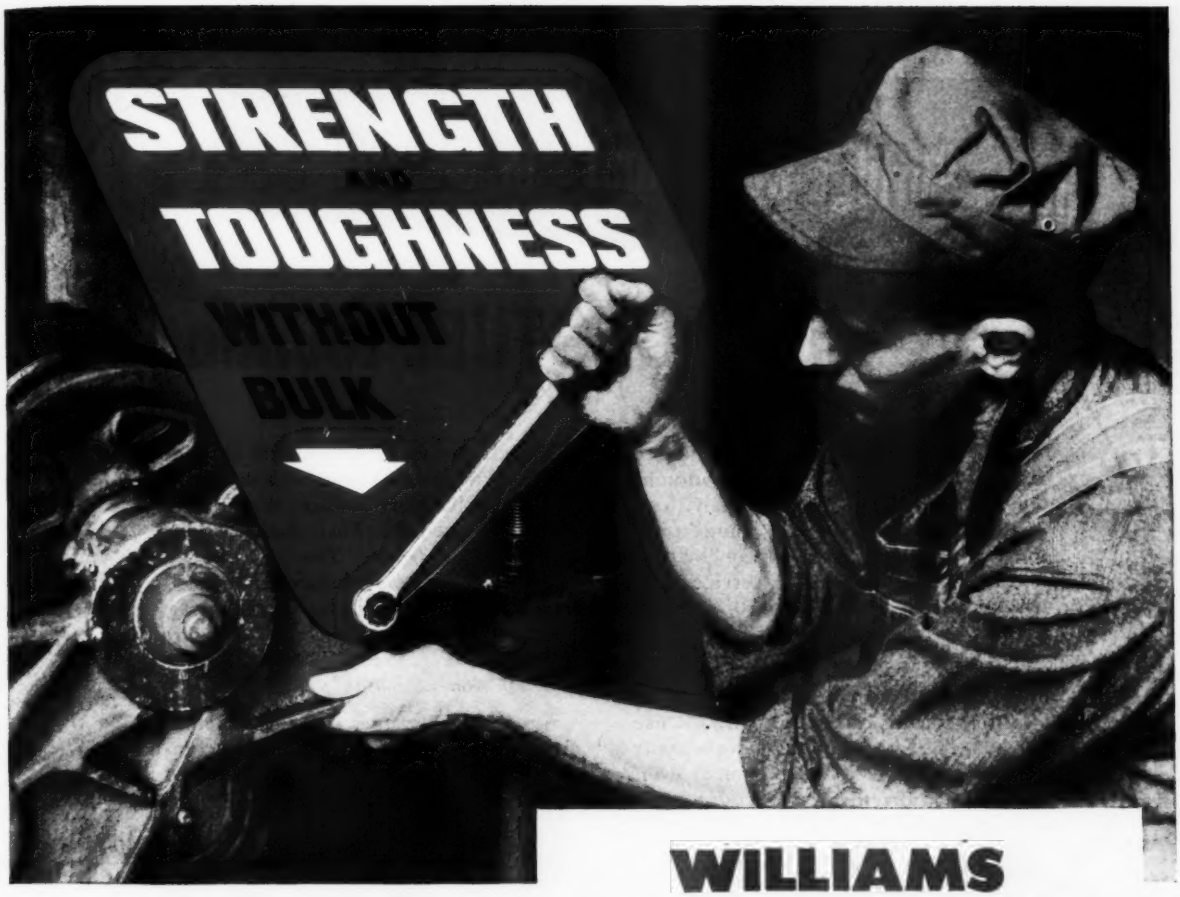
## Proved on the Job

● THEY HAVE EARNED A PLACE IN YOUR 1948 BUDGET. THEY WILL PAY THEIR WAY summer and winter. Spot or gang tamping, crib busting, winter ice service —on all of these jobs Barco Unit Tytampers are unbeatable.

● Many 1947 maintenance programs were completed ahead of time due to the use of Barco Unit Tytampers. Protect your 1948 program with Barcos. (Write for full information to Barco Manufacturing Company, Not Inc., 1805 Winnemac Ave., Chicago 40, Illinois.)

**BARCO**
**UNIT**
**TYTAMPERS**

*Free Enterprise—the Cornerstone of American Prosperity*

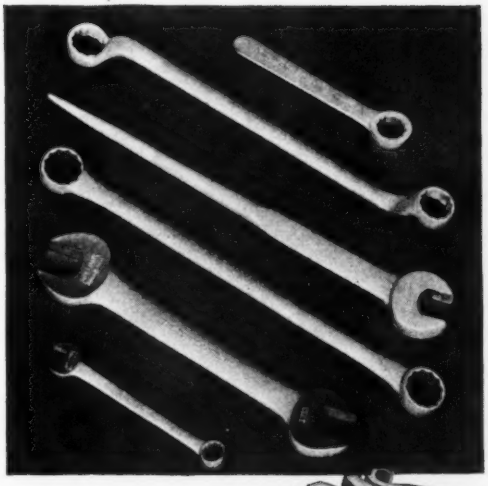



# WILLIAMS "SUPERRENCHES"

● If you want the maximum in wrench strength and toughness with an absolute minimum of bulk and weight . . . your answer is a Williams "Superrench."

These fine wrenches are drop-forged from selected alloy steel and heat-treated, permitting trim, slim lines and exceptional balance. Made in a wide variety of patterns and sizes. Attractively finished in chrome-plate, over nickel, with highly-polished heads. Sold by leading Industrial Distributors everywhere.

**J. H. WILLIAMS & CO., BUFFALO 7, N. Y.**



WILLIAMS

DROP-FORGINGS AND DROP-FORGED TOOLS

# Here's "bridge-work" that's in for good...

## on a MONOTUBE foundation

HERE is another foundation job getting started *right*—with Monotube tapered steel piles. Approximately three hundred and fifty 3 and 7 gauge piles were used to make this railway "bridge-work" good for years of service. Pile lengths varied from 45′ to 70′.

The job's construction superintendent wrote: "The Monotube piles were driven by use of a timber grillage for holding the piles in position and eliminating the use of leads. The light, rigid piles were easily handled and held their alignment even though hard driving was encountered."

Monotubes are chosen on job after job by experienced, economy-minded engineers and builders because they reduce costs . . . save time *Their fluted, tapered design speeds driving. They're easily extendible, right on the job. Tubular construction makes inspection, before concreting, quick and easy. Light in weight, they are easily and quickly handled. Their sturdy construction eliminates use of driving mandrel.*

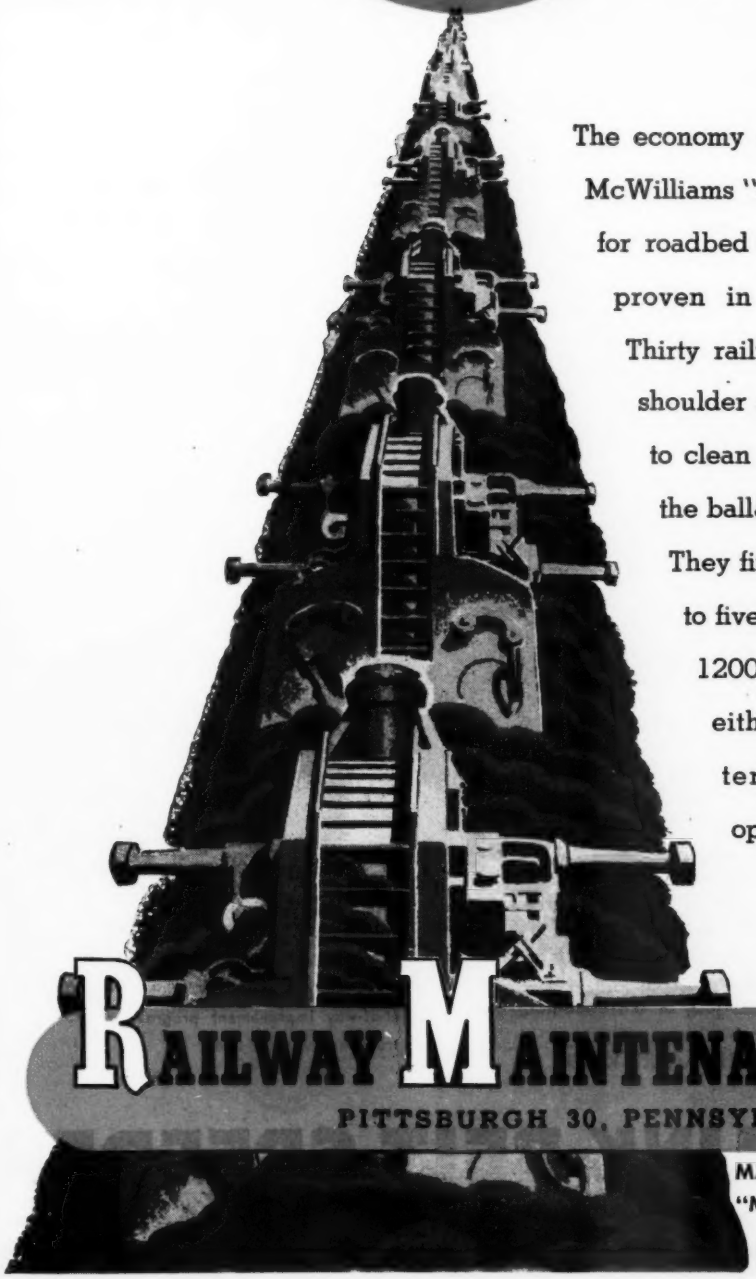
Available in gauge, size and taper to meet varying soil conditions. For complete information, write The Union Metal Manufacturing Co., Canton 5, O.

**UNION METAL**

*Monotube Foundation Piles*

389

McWILLIAMS MOLES USED BY 30 RAILROADS



The economy and efficiency of the McWilliams "Mole" Ballast Cleaner for roadbed maintenance is being proven in service every day. Thirty railroads use 389 of the shoulder and intertrack models to clean dirt and cinders from the ballast of their roadbeds. They find that a crew of four to five men can clean 850 to 1200 feet in 8 hours with either model without interference with train operations.

RAILWAY MAINTENANCE CORP.

PITTSBURGH 30, PENNSYLVANIA

MANUFACTURERS OF THE McWILLIAMS "MOLE" and RMC RAIL JOINT PACKING

# Main-Line Main•tenance is Easier With

Simplify and Speed-up your earth-moving or material handling operations by giving such work to a Link-Belt Speeder shovel-crane —Crawler-mounted off-the-track equipment is the logical choice for this type of work, as it is easily maneuvered into its most favorable operating position, and continues to work regardless of traffic on the rails.

Railway men appreciate the clean cut design of Link-Belt Speeder machines, which are engineered for long life, trouble-free operation, high productivity and minimum upkeep. Quick convertibility from one front end attachment to another gives high utility to this rugged machine, which is a shovel on one job, a dragline, clamshell or pile-driver on another job, or a trench-hoe on a still different job.

The Link-Belt Speeder does MORE WORK, MORE KINDS of work, MORE OF THE TIME!

Link-Belt Speeder Model LS-50 equipped as a drag-line, excavating ditches and loading gondolas on the right-of-way improvement program of a prominent western line.

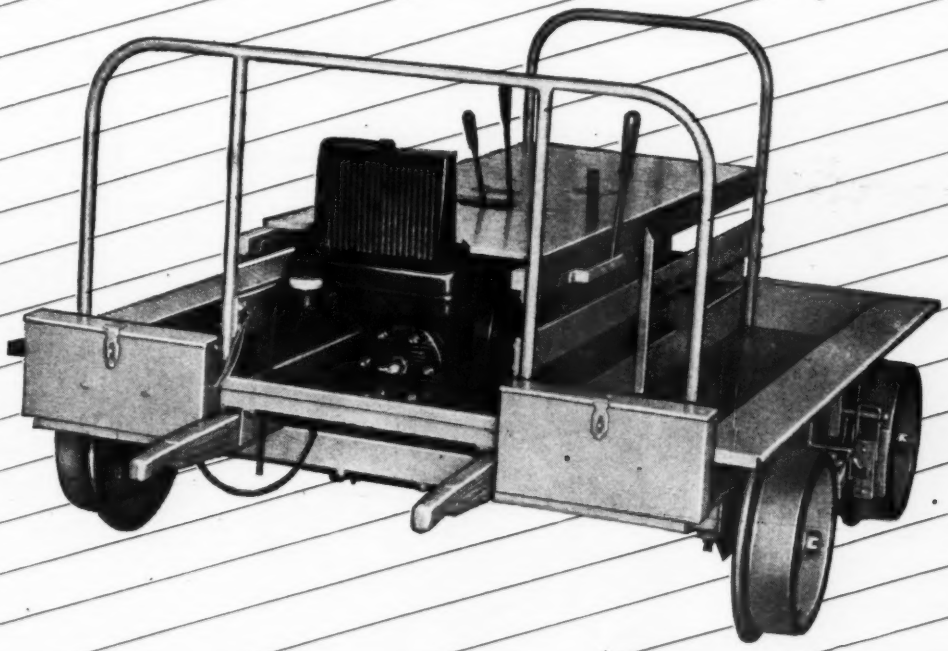
10,540

*Ask for illustrated bulletin on the "CARGOCRANE" the Wheel-mounted Yard Crane.*

**LINK-BELT SPEEDER**

*Builders of the Most Complete Line of*
**SHOVELS-CRANES-DRAGLINES**

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.



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Railroad Motor Cars
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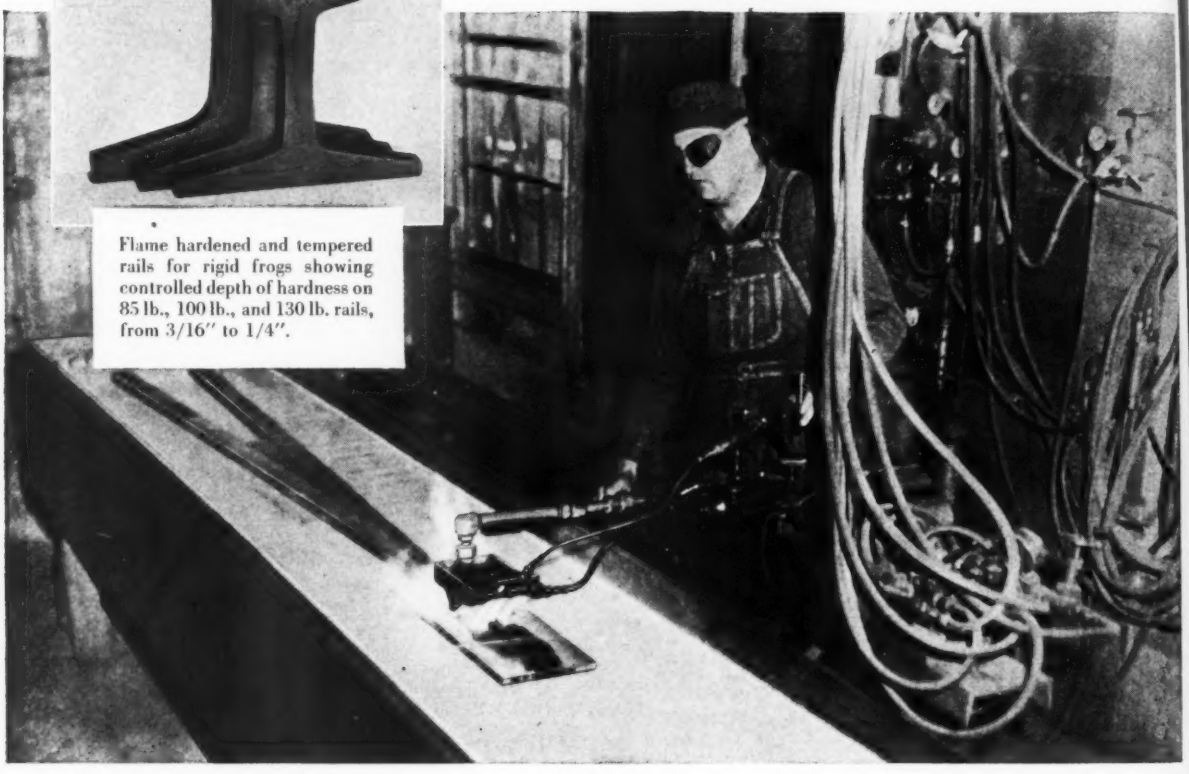
*Here's How "Costs Come Down Under the Airco Plan"*

***"We have used Airco flame hardened frogs since 1944, and have saved $1253.11 on a single installation"***

*. . . says a leading railroad in the Southwest.*

Flame hardened and tempered rails for rigid frogs showing controlled depth of hardness on 85 lb., 100 lb., and 130 lb. rails, from 3/16" to 1/4".



Several years ago frog service life on this railroad averaged six months—replacement costs were $209.39 for each new installation.

In March 1944 Airco's modern flame hardening method was introduced, and flame hardened frogs were installed under regular traffic conditions.

A continuing test on one of these flame hardened frogs was made. Three years later it was still in service, giving it a life of seven ordinary replacements—resulting in an actual saving of $1253.11.

The Airco flame hardening method is simple and economical. It is flexible and selective for application in the shop or field on small or large objects—flat or circular surfaces. Its outstanding quality is it provides sufficient surface hardness to retard wear without affecting toughness or shock resistance of the core metal.

For further details about this process write for free, illustrated information. Or if you prefer, an Airco railroad technical representative will be glad to call on you personally. Just write your nearest Airco office or Dept. 7752, Air Reduction, General Offices, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, General Offices, Houston 1, Texas.

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A complete arc welding service for railroads. One of many AC and DC models, the P&H WN-300 Welder provides a welding service range of from 30 to 375 amperes. Available with 2 or 4-wheel trailer mounting. Ask for Bulletin W-325.

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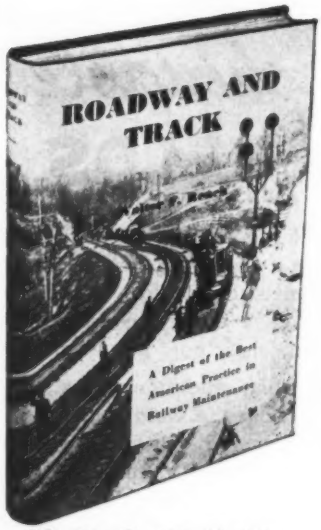
# ROADWAY AND TRACK

**By Walter F. Rench**

*Formerly Supervisor on the Pennsylvania Railroad;*
Author of *Simplified Curve and Switch Work*

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The new edition features the use of the latest mechanical equipment in connection with roadway and track maintenance. Older methods employed where full mechanical equipment is not available are also explained. While most of the methods described are those which are standard on the *Pennsylvania,* A.R.E.A. recommended practices and those in use on other well maintained roads have also been included.

Outstanding types of mechanical equipment used in track work are described and illustrated with action photographs. Engineering drawings show working details. The economies resulting from the adoption of modern methods are clearly outlined. Useful tables have been added to make the book suitable for reference use, as well as a practical handbook on modern methods.

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While written primarily to serve the needs of track supervisors and other maintenance officers, the new edition contains material of considerable interest to transportation and mechanical officers who require a working knowledge of the fundamentals of maintenance of way practice. Section and extra-gang foremen, who wish to acquire a broader knowledge of their work and of methods used elsewhere, will find the book helpful.

## CONTENTS

Part I—ROADWAY: Essential Elements in Roadway Maintenance—The Right of Way—Drainage of Roadbed and Track—Vegetation for Banks—Economics of Roadway Machines—Labor Saving Methods and Devices in Roadway Work—Small Tools and Their Uses.

Part II—TRACK: Essential Elements in Maintenance of Track—Program for Maintenance of Way and Structures Work—The Track Obstruction—Power Machines and Equipment—Labor Saving Methods in Track Work—Track Materials and Their Uses—Practice in Rail Renewals—Practice in Rail Repair and Inspection—Maintenance of Main Tracks—Maintenance of Yards and Terminals.

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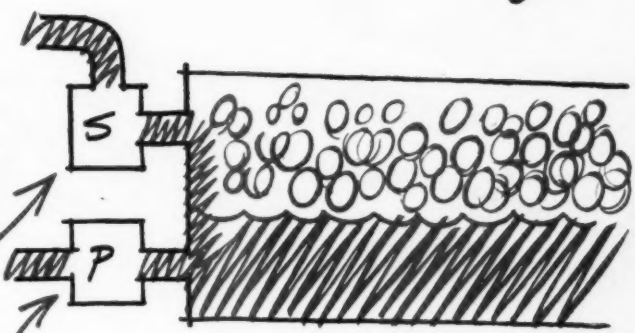


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These "soap" formations grow to form a tough, impervious, intermeshing matrix within the paint film, as shown in the photomicrographs below. These "soaps" help Red Lead inhibit rust three ways.

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**2. Make Film Water-Resistant.** The very structural formation of these "soaps," with their thick, impervious matrix of closely-knit fibres, helps restrict the passage of moisture through the paint film. And metal cannot rust without the presence of moisture.

**3. Keep Film Flexible.** The "soap" formations, far from being rigid, allow movement all along their soft, intertwining projections. The resulting flexibility helps prevent the ruptures to which a hard, unyielding paint film is subject. Thus the lead "soaps" aid in maintaining the continuity of the paint film.

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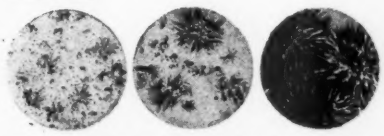

*The photomicrographs above show how Red Lead "soaps" progressively spread out as they grow and thus reinforce the paint film.*

Remember, too, Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including fast-drying resin types.

**Specify RED LEAD for ALL Metal Protective Paints**

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*The benefit of our extensive experience with metal protective paints for both underwater and atmospheric use is available through our technical staff.*

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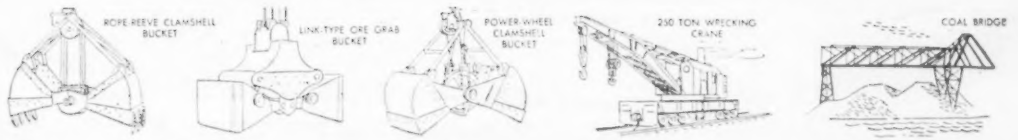


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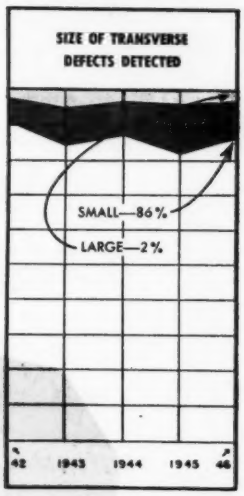
## To Find Rail Defects When Small

Proof that Sperry's accuracy increases railroad safety. Consistent results seen in this chart have been obtained with frequent testing.




# WHY SMALL DEFECTS ARE IMPORTANT!

Detection of rail defects when *small* (less than 20% of the cross sectional area of the rail head) is important because:

1. **Small defects have caused serious derailments.**
2. **Small defects have grown rapidly (or suddenly) to a large size—resulting in broken rails.**

*101 Railroads* now test rails in track regularly with Detector Cars operated by Sperry. These roads have the satisfaction of knowing that they use the most efficient method of detecting *hazardous transverse* and *longitudinal* rail defects — that they obtain maximum track safety with Sperry.

Sperry stands ready to make comparative demonstration tests to prove superior detection performance. SP-110

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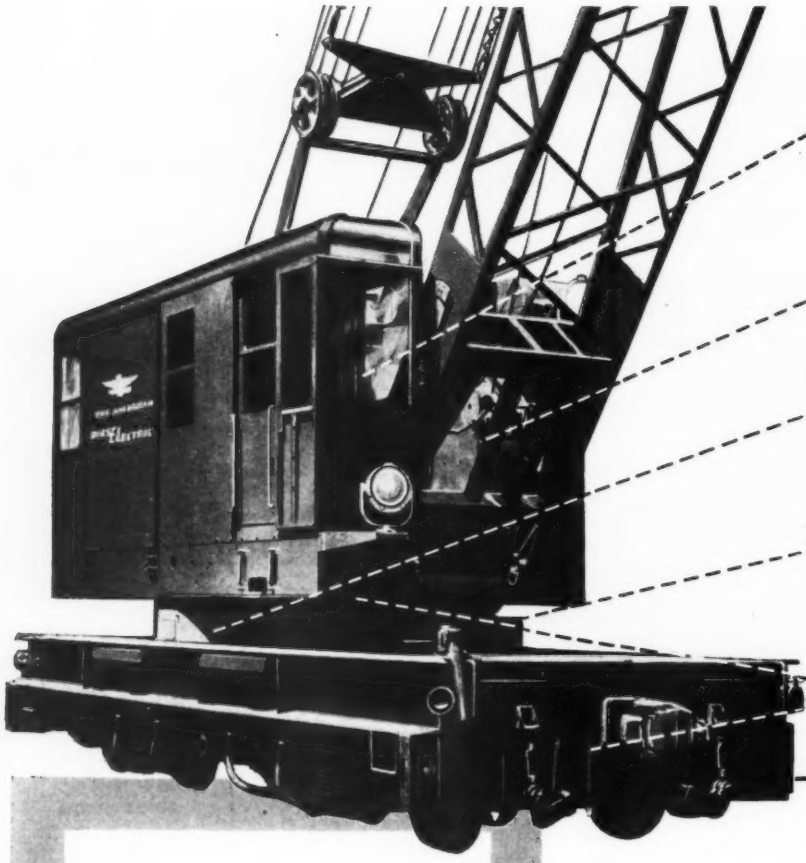

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graduated air controls

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**DIESELECTRIC**
Locomotive
Crane
*Continues an Impressive List of...*
# "FIRSTS"!

Here is the remarkable new locomotive crane that writes off its own cost in five years. The crane with "DIESEL power to the deck; ELECTRIC power to the trucks." It's the biggest locomotive crane news of 1947!

For the background of this news, let's look at the record. Named above are five of the most important all-time developments in locomotive crane design. *All five* are American Hoist "firsts"! In addition, more than a dozen other major improvements (travel throw-out clutch, enclosed travel gears, etc.) could be added to the list. Nearly all of these advancements have been adapted or copied widely.

The DIESELECTRIC is, indeed, revolutionary. More than *seven tons* of wearing parts have been eliminated. Maintenance expense has been cut 25% to 50%. Every part of the crane is new—designed specifically and solely for the DIESELECTRIC. The past record of all "American" Locomotive Cranes, and the long years of testing and development that went into the DIESELECTRIC assure it a brilliant future.

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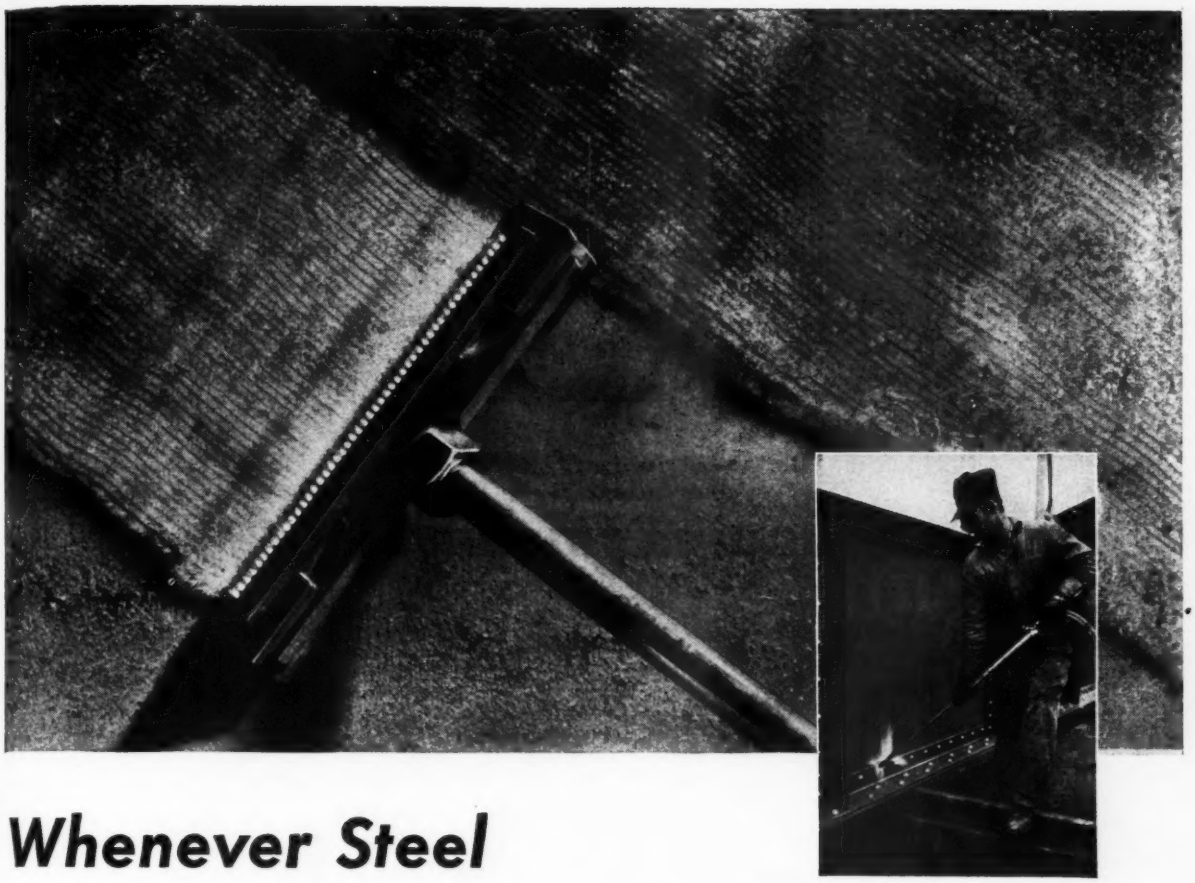

# Whenever Steel Must be Dried or Cleaned

## Use OXY-ACETYLENE FLAME-CLEANING

● Moisture, rust, and surface contaminants are quickly removed from iron and steel surfaces with the high-temperature oxy-acetylene flames produced by Oxweld's flame-cleaning equipment.

These flames consume or neutralize oil, soot, old paint, and other foreign matter that may be present. They evaporate all traces of surface moisture. And they cause the rust and scale to expand and pop off, leaving a clean, warm, and dry surface on which paint will spread evenly and bond tightly.

Oxweld's flame-cleaning equipment can be maneuvered to clean thoroughly and quickly corner angles, riveted areas, and irregular shapes, as well as flat and round surfaces. This equipment can be used to clean all types of structural steel—bridges, train sheds, station buildings, pipe, tanks, rolling stock, and steel work inside tunnels. Ask an Oxweld representative for information regarding a demonstration.

**THE OXWELD RAILROAD SERVICE COMPANY**
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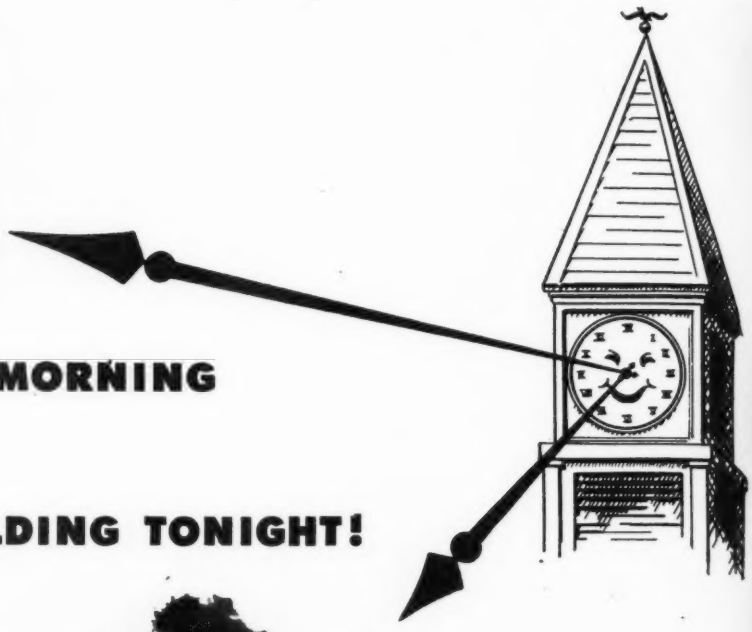
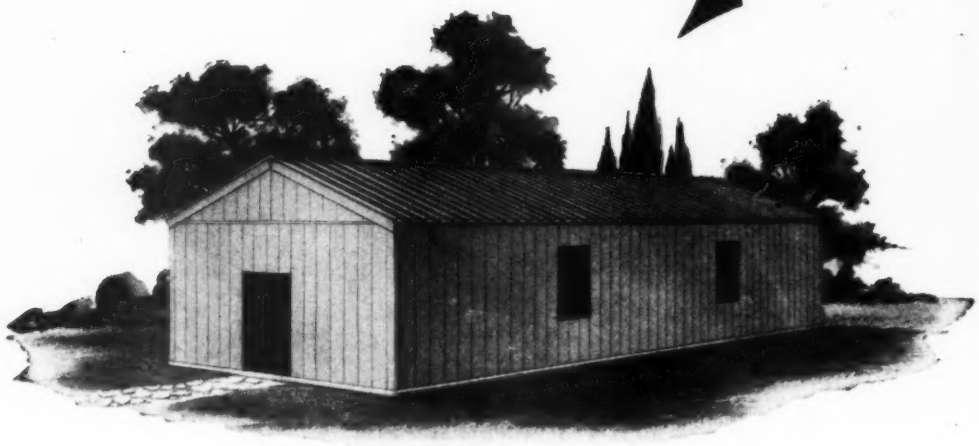


## STEEL THIS MORNING

## ...A BUILDING TONIGHT!



That's no exaggeration—not with ARMCO Standard STEELOX Buildings. Stacked on the building site at 7 a. m., the structure is often "under cover" by night. STEELOX is so simple it's unique. Made of ARMCO Galvanized PAINTGRIP Sheets, to take and hold paint, the panels interlock to form a strong, tight, fire-resistant structure, exceptionally low in cost and with high salvage value.

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See for yourself how easily and economically STEELOX Buildings can solve your building problems. Use them for offices, tool houses, utility buildings and wherever else you need a permanent-type, easily erected structure. STEELOX Buildings are prefabricated in a wide range of standard sizes to fit your requirements. Write for prices and complete information. Armco Drainage & Metal Products, Inc., 2465 Curtis Street, Middletown, Ohio.

ARMCO

**ARMCO**

**STEELOX BUILDINGS**

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LEONARDO DA VINCI'S genius conceived a technically sound airplane and even the principle of the cylinder and piston (the latter in a steam cannon). But nearly four centuries passed before powered flight was a reality at Kittyhawk. So far was he ahead of the world that no man lived who could take up the torch which he kindled in the world's struggle for emancipation from creeping travel and crushing toil.

Today, internal-combustion power is a servant of man in a thousand ways that even a Leonardo could not have conceived. The matériel of agriculture, commerce and industry moves freely through the world's trade channels on planes, ships, trains and trucks powered by gasoline and Diesel engines. Construction, re-construction, eventual world abundance are within reach with internal-combustion engines at their specialized tasks.

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Engineering and Maintenance
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105 WEST ADAMS ST.
CHICAGO 3, ILL.

**Subject:** Intensive Readership

December 1, 1947

Dear Readers:

We have so much definite proof of readership of our pages from both railway men and railway supply men that to comment on this readership is equivalent, in a manner of speaking, to "gilding the lily".

"You really hit the nail on the head with that editorial——!"

"That article on —— certainly has created widespread interest and discussion!"

"Your What's the Answer columns are invaluable to us men in the field!"

"We have been highly gratified with the inquiries that have come directly as the result of the publicity in your pages."

These are typical of the unsolicited comments that come to us month after month, as many of you know to be a fact, having made just such comments to us yourself. So my letter to you this month is not to discuss readership of Railway Engineering and Maintenance as such, but to point out the super-readership that is being attained on many roads, to the benefit of all concerned.

For many years, to our knowledge, one chief maintenance officer has been addressing monthly letters to all of his supervisory officers calling attention to articles of particular importance, or with especial timely interest, and asking for their comments. A foremen's group states that a discussion of the questions in our What's the Answer columns forms a part of every one of its meetings. Only last month, the chief engineer of a large western road wrote that, "We route some of our copies of Maintenance to several of our maintenance officers, some of these copies reaching three or four, or possibly five. In this way we think all of our maintenance officers, from track supervisor up, have an opportunity to read Railway Engineering and Maintenance."

Still more recently, another chief engineer said that there is seldom an issue of Maintenance that he does not initial to several of his department heads, calling their attention to specific articles or editorials and asking for comments of one character or another.

Again, I point out that to mention these evidences of intensive readership of Maintenance from month to month is in nowise an attempt to substantiate our claim of readership, as such, but rather to suggest to some of you how some others get the most out of our pages. True, it may take a few extra minutes for you to call for comments and discussion from among your men relative to the practices, methods or products described in Maintenance, but we have yet to hear anyone who follows this practice say that the time and effort involved are not well spent.

Our interest in all of this is that you, your men, your department, and your railroad, get maximum benefit from each issue of Maintenance.

Sincerely,

NDH:jb

Neal D. Howard
Editor

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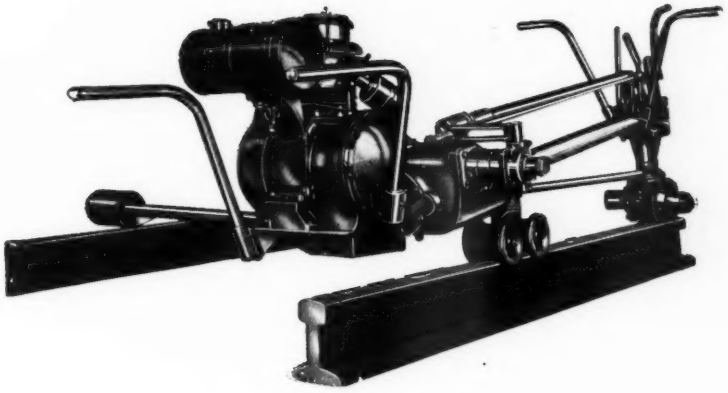
*Soundly Engineered*



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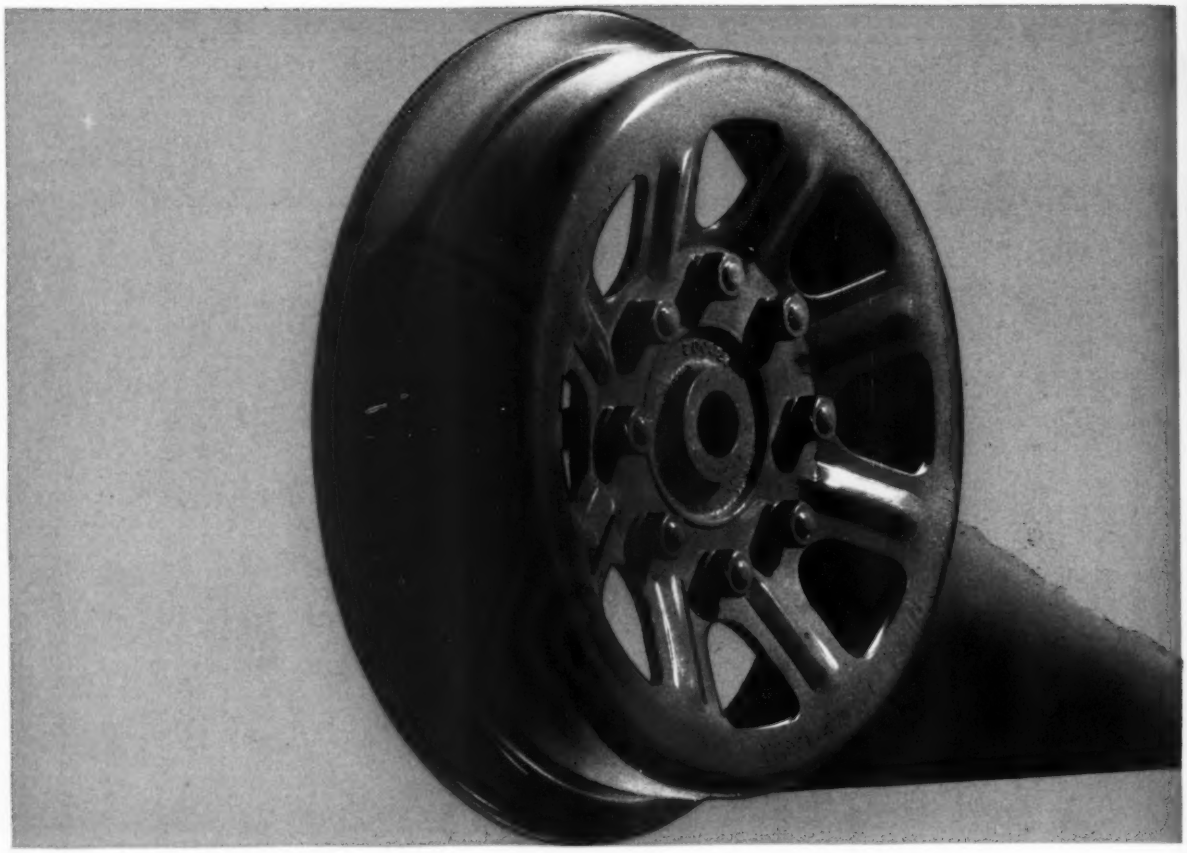

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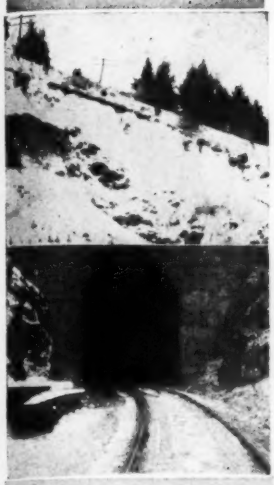


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**Editorials** - - -

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Railway Engineering and Maintenance

# *Selling Service—*

## Part of the Job of Every Railway Employee

The prosperity of the American railways, and of their employees, rests fundamentally upon their ability to sell their services to the American public. These services are the only source of railroad income, from which they must pay all of their bills, and they can be adequately remunerative only if sold in large volume.

One of the most vital and personal services rendered by the railroads is their passenger service, and, unlike their freight service, which is being taxed to the limit of available cars, it is available in abundance on many roads and awaits only being sold to the public on a larger scale. Obviously, therefore, here is the greatest present opportunity for increased sales of railway service. How can these sales be made?

One answer to this question is for the railways to continue to make their passenger service more attractive in comfort, convenience, speed, and even luxury, than ever before. Another is, having done this, to herald their improved service so widely as to create for it an irresistible appeal. To provide both of these answers most effectively calls for the combined interest and effort of both managements and employees.

But, while continuing improvements in passenger service and an extension of that service are essential to continuing increases in passenger business, the railroads already have much to sell—a fact which is not generally appreciated by the public and by many employees. True, during the war years the construction of passenger train cars was at a standstill—by order of the Office of Defense Transportation—and both the quantity and quality of passenger service was far from adequate. But it is not generally known that since the war, in spite of labor difficulties and continuing shortages in steel that have held car production far behind orders placed, there have been more developments and improvements in passenger train service and equipment than in any other like period.

Since the war, a total of 932 new postwar passenger cars were completed up to June 1, 1947, and, as of that date, 2,470 new passenger train cars were still under construction or on order. During the last 12 months alone, from Nov. 1, 1946, to Oct. 31, 1947, the number of passenger cars built and delivered to domestic roads totaled 809, and as of the latter date there were still 3,026 such cars on order.

Not to be overlooked, too, is the fact that since the first streamliner in 1934, 154 sets of streamlined passenger train equipment have been placed in service—at least 38 in the last year and a half. And in that same period more than 730 passenger Diesel units—which have contributed so much to improved passenger service—have been placed in operation.

As to the luxury of most of the passenger cars that have been put in service, there has been no equal in any form of transportation service in the world. As recent as November 12, the Chicago, Rock Island & Pacific exhibited nine new luxury cars to augment present modern cars in its fleet of 20 streamliners. Typical of these newest cars is the "Fiesta" coffee shop-lounge car, which is brilliantly decorated in colors of Mexico and the Southwest, with a canopied ceiling in red and white and a tiled floor in red and yellow. Tables, seating 32, are of oak, hand-carved by Jesus Torres, a craftsman from south of the border. The chairs, also of oak, are upholstered in orange-red leather with rawhide lacing, and draperies are of serape patterns.

Truly, the railways already have something to sell in passenger service, and yet, according to this year's Public Opinion Survey conducted for the Association of American Railroads, more than half the persons interviewed

did not know of *any* improvements in service or equipment which the railroads had made recently. Herein lies the need for real sales effort because it is evident that the finest product in the world cannot be sold unless the public knows about it.

At the annual meeting of the American Association of Passenger Traffic Officers at Asheville, N. C., in October, F. H. Baird, general passenger traffic manager of the New York Central, hit the nail on the head when he said that if the railroads don't publicize the actual improvements made in their passenger service, "we're just chasing each other around the stump." Equally pertinent was his suggestion that the one and one-third million employees of the railways be urged and equipped to "talk up" the good things in railroad passenger service—a suggestion which, if followed to its fullest extent, could bring about a boom in passenger traffic, the like of which had not been known in previous years.

Obviously, the present efforts of the railroads to improve their passenger service must be continued and extended to a far greater mileage. That is fully recognized and is being carried out as rapidly as possible. But the point is that they already have much to sell, and that they will not even sell this effectively unless all employees do their part and constantly "talk up" railroad achievements and service.

# Insulated Joints—

## Properly Maintained Ones Are Hard to Find

ELSEWHERE in this issue appears an article entitled, Insulated Joints—Their Installation and Maintenance, in which the author, a man unusually well versed in the design, manufacture and maintenance of this type of joint, points out the vital need for definite rules of practice for installing and maintaining these highly important fastenings. He suggests 14 such rules, all of which, in his opinion, must be followed if an insulated joint, even if constructed of the finest materials, is to remain effective over a reasonable period.

Few experienced railway men will admit that they are not acquainted with all of these rules, and most of them will insist that the standards involved are being followed to the fullest extent. But are they being followed as generally as the need would warrant? A recent experience would indicate that they are not.

In an attempt to secure suitable photographs to illustrate the article in question, an editor of this paper made a rather extensive search on the railroad lines within a distance of about 60 mi. from his home. The search, admittedly, was not exhaustive. He visited random locations, such as wayside signals convenient to highways, grade crossings having automatic warnings, and some turnouts in automatic-signal territory.

Approximately 25 insulated joints were inspected on six roads in the territory covered and, surprising as it may seem, not one of these would meet all of the standards of installation and maintenance laid down in the article. Of the six-hole joints inspected, not one was equally supported on three ties, and two of these improperly-supported joints were found in track on which new rail had been laid this year, after which the track had been thoroughly worked, including the respacing of the ties. Bolts were found to be loose in several cases, evidence of creeping rail was apparent in another, and many of the joints were splattered with mud, indicating loose and churning ties.

While the conditions found at these locations may not in themselves be particularly serious, they are an indication that the best practices are not being followed in many cases, and that the track forces, in some instances at least, are either ignorant of what these best practices are or are disregarding them. Obviously, roadmasters and supervisors cannot make a detailed inspection of every insulated joint on their territories. They can however, educate their foremen in the proper methods of installation and maintenance and, by occasional checkups, satisfy themselves that the instructions are being carried out. If the article herewith referred to will assist in this education, the author's purpose in preparing it will have been achieved.

# Inspections—

## Unexpected Visits May Be Disconcerting

SOME higher officers in the engineering and maintenance departments, and even at the management level, have a disconcerting habit (from the viewpoint of field supervisory personnel) of appearing unexpectedly to inspect specific jobs. When this happens the division engineer or the track supervisor, or other local officer with direct responsibility for the particular work, may undergo an uncomfortable period in which he finds himself on the defensive because of points raised by his superior.

Perhaps the higher officer will notice that a valuable machine made available to aid the work is not being used or is being used improperly, or he may find that the foreman is allowing practices that result in inferior workmanship. Frequently, human nature being what it is, the local supervisor will find himself adopting a resentful attitude as the result of such experiences. Further, he may feel that his superior has been unfair in not advising him in advance of the impending visit to the work. Undoubtedly, there are cases where such reaction on the part of the supervisor may have some justification, such as where a chronic fault-finding attitude is exhibited.

But there is another side to such a situation—that of the superior. Confronted with the problem of determining the true state of affairs in the field he may feel that this objective would be defeated if he were to advertise his inspection trips in advance, thereby allowing time to correct or "cover up" improper conditions. He may reason further that any adjustment of conditions made in this manner might be only temporary, with reversion to the improper practices afterward.

There is a simple but effective procedure by means of which local officers can help avoid being the object of justified criticism during unscheduled visits of their superiors. This procedure is to conduct themselves and their work at all times as if an immediate inspection were anticipated. This may entail closer supervision, more attention to detail and greater effort all along the line, but the rewards in the form of increased satisfaction with a job well done will far outweigh any sacrifices involved.

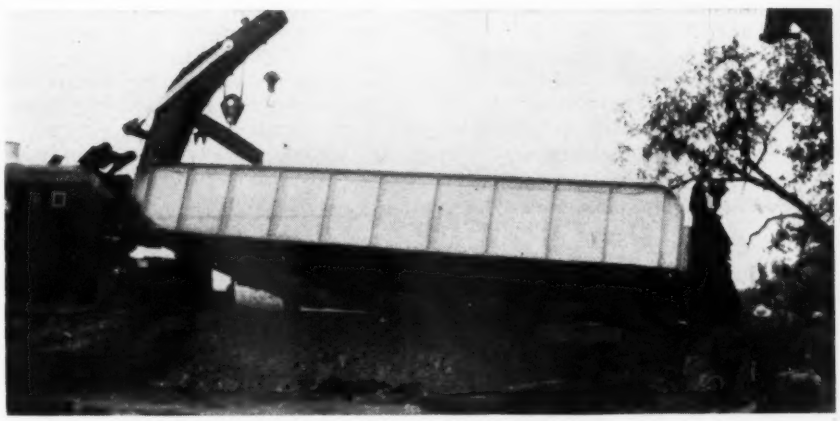
Lifting the Bridge From Its Original Location and Setting It Out on the Temporary Bridge Seat Extensions to the Old Abutments

**Faced with the necessity of relocating a double-track, ballast-deck, through plate-girder bridge due to channel changes, the Denver & Rio Grande Western successfully accomplished this work in a minimum of time without interruption to traffic or dismantling the structure. This article describes in detail the methods which were employed in moving the bridge.**

# Rio Grande Moves Bridge Intact

THE Denver and Rio Grande Western recently moved a double-track, ballasted-deck, through plate-girder bridge 125 ft. to a new location by means of wrecking derricks, without dismantling it or causing delay to traffic. Located at Mile Post 126.59 on the main line 7 mi. west of Pueblo, Colo., the bridge is 48 ft. long and weighs 100 tons. The need for relocating the bridge was brought about by the straightening of a creek channel at this point, which moved the crossing of the railroad 125 ft. west of the original site.

In electing to move the bridge intact, several special conditions had to be met in providing material for filling the channel at the existing site, providing temporary supports at the new site and temporary falsework extensions to the bridge seats at both locations. These conditions were solved without undue trouble. In the first instance, excavation of the new channel provided material for filling the old stream bed. This material was stock piled at the site of the bridge for filling in after the removal of the bridge. Secondly, a temporary trestle was constructed to carry the tracks



Placing the Bridge on the Reconstructed Tracks at the Site of the Original Opening, Preparatory to Skidding It to Its New Location

View of the Temporary Trestle Carrying the Tracks Across the New Channel. Note the Temporary Falsework and New Abutments

After the Temporary Trestle at the New Site Had Been Removed, the Bridge Was Placed on the New Abutments in Its Final Position

over the new channel. The third operation involved the construction of permanent concrete abutments at the new location of the bridge, while the last of the preliminary work was the construction of temporary timber falsework extensions to the bridge seats at both the original site and the new location, for a resting spot for the structure during the actual work of relocating it. Prior to the actual moving of the structure, the stream was diverted into the new channel and the old channel filled in to the underside of the girders by means of a bulldozer.

On the morning the move was started an operator was stationed at Swallows, Colo., approximately 15 mi. from Pueblo, to direct single-track operations between these points during the bridge-moving operations. Two wrecking derricks were called out and spotted at opposite ends of the bridge, with outriggers and blocking completed at 6:20 a.m. These derricks occupied the eastbound track. Both tracks were then removed from the bridge and, at 6:40 a.m., the bridge was lifted from its abutments and deposited on the temporary falsework extensions to the bridge seats. This was completed at 7:40 a.m. The next operation was that of filling in and constructing track at the former location of the bridge. The filling was done by means of a bulldozer, and the completed eastbound track was opened at 10:15 a.m.

At 1:25 p.m. the use of the tracks was again obtained and the bridge placed on the running rails of the double-track roadway by means of the two derricks. Movement of the span to its new location was done by greasing the rails and skidding it along them a distance of 125 ft., where the derricks again lifted the bridge and set it on the temporary bridge seat extensions at the new location. This latter work was completed at 3:21 p.m. To finish the day's work and to prepare for setting in the bridge the following day, the two derricks were used until 4:45 p.m. and 6:45 p.m., respectively, in removing the temporary trestle under the westbound track. With this track out, the work was closed down for the day and the eastward track was used for single-track operation overnight.

The second day operations included the removing of the temporary trestle under the eastbound track and placing the bridge in final position. After the two derricks were spotted, one at each end of the bridge, the temporary trestle was removed. The derricks then lifted the bridge from the falsework and placed it on the new abutments in its final location. This was completed at 8:45 a.m. The track structure was then constructed over the bridge and both tracks placed in service at 10:00 a.m., the second day's operation having required 4 hr. and 45 min.

The planning of the work was done under the general direction of A. E. Perlman, chief engineer of the Rio Grande. Field operations were carried out with close cooperation between the various departments involved, the following officers being in attendance during the actual progress of the work: W. B. Jacobsen, division engineer; T. W. Inman, assistant superintendent; G. B. Aydelott, trainmaster; M. M. Lockard, assistant trainmaster; E. T. Richie, supervisor of structures; A. G. Cudworth, assistant engineer of structures; and C. R. Holmberg, signal supervisor.

# Handling Rails with Crawler Tractors

CRAWLER tractors were used to advantage for handling rails in two recent projects on the Pere Marquette district of the Chesapeake & Ohio. On one of these, in Wyoming yard, near Grand Rapids, Mich., C.&O. constructed a new track leading to the enginehouse to serve Diesel locomotives. A Caterpillar Diesel D-4 tractor, equipped with a Hyster side boom, was used to place the rails of the new track into position. In this work, the rails were loaded on push trucks and brought to the "end of track." The boom-equipped tractor, operating alongside the new track, then lifted a rail from the push truck and moved ahead to lower it into position on the ties, this procedure being repeated until the job was finished.

In another project—this one on the main line near Romulus, Mich.—another tractor was brought into use on a rail-laying project for unloading the rails from gondola cars. In this case, a Caterpillar D-6 tractor equipped with a Hystaway was loaded into a gondola car incorporated in the work train from which the rails were unloaded. A crew of eight men was used for this operation. It is reported that 100 to 120 rails per hour were unloaded by this method.

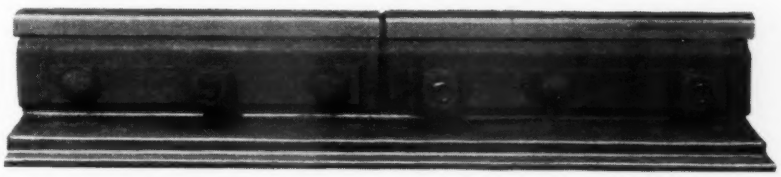
**Below — Tractor with Side Boom Lays Rails for a Yard Track. Right —Unloading Rail with a Boom-Equipped Tractor Working from a Car**

# *Insulated Joints—* Their Installation and Maintenance

By E. F. SCHERMERHORN

Manager, Insulated Joint Department,
The Rail Joint Company, Inc., New York

**In this article, submitted for publication last month in the What's the Answer department, the author delves deeply into the wealth of knowledge which he has garnered from his nearly 50 years of experience in the design, manufacture, and maintenance of insulated joints. By briefing a number of recently-reported complaints of alleged failures of insulated joints, Mr. Schermerhorn leads up to the vital need for established rules of practice for their installation and maintenance. He includes 14 such rules which he feels are vital to the economical performance of an insulated joint. The failure to follow any one or more of them will, in his opinion, tend to shorten the life of the insulation and reduce the effectiveness of the joint.**



Top—A Regular-Type Non-Armored Continuous Insulated Joint. Bottom—An Armored-Type Continuous Insulated Joint

OCCASIONALLY special problems arise involving insulated joints which are caused by local track conditions or operations, but these cannot be discussed generally, because each one varies with local conditions and requires individual solution. The chief problems are: (1) To secure a reasonable length of service from the insulation; (2) to maintain effective insulating protection for the signal system; (3) to maintain safety of track; (4) to avoid excessive wear and damage to the rail ends.

To secure all of these results, insulated joints must be properly and carefully applied and be systematically maintained according to recognized rules of practice. Neglect of these essentials is the cause of the great majority of troubles and complaints involving joints on all railroads, resulting in waste of money, time, and labor expenses in too-frequent renewals of insulation and in repairs of damage to joints and rails. Much trouble and expense could be avoided by careful supervision of the upkeep of joints.

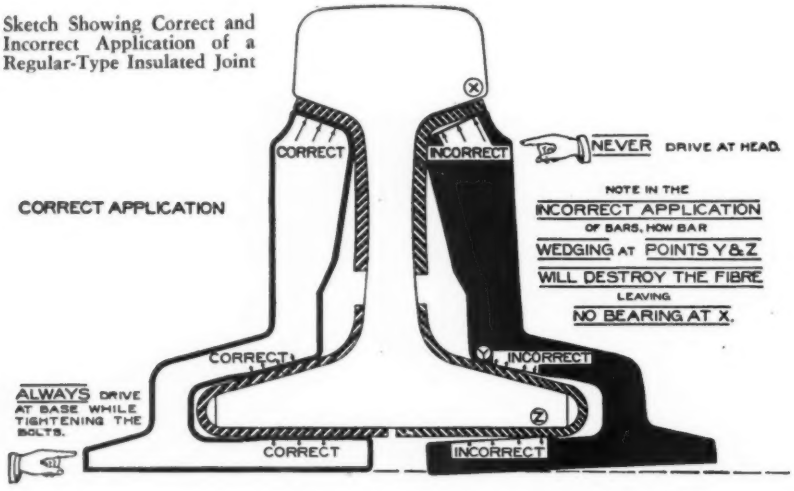
No insulated joint can be foolproof, though the types currently used are made as nearly so as practicable. The insulated joint must serve the dual purpose of substituting for the all-steel angle-bar in supporting and protecting the rail ends, and of providing means for insulating the track circuit. The use of insulating material more compressible and less durable than steel, and the necessity of maintaining a ⅜-in. to ½-in. gap between rail ends to permit use of an insulating end-post, render the insulated joint more vulnerable to wear than an ordinary joint, and make the impact upon rail end and ties considerably greater. Consequently, it is only reasonable to expect that the insulated joint requires better and more frequent maintenance than the ordinary joint, and yet it too often does not get any greater amount. With its multiplicity of parts, closely interfitting with each other to reduce play and excessive wear, the insulated joint requires careful, accurate installation, with particular attention paid to alternately tightening bolts and mauling the base of the joint while tightening to seat the joint bars properly on the base of rails. This requires handwrenching and not power-wrenching. There should be special, periodical maintenance attention, and ties should be spaced *equally* under each rail end, regardless of the method of tie-spacing employed elsewhere.

The types of joint used at present have been developed by the manufacturers from many years of experience with the problems encountered in service, and are designed to function properly under all reasonably fair conditions. Whenever added experience or changing conditions show the advisability of modifying the design or dimensions of any part of the joint, such change is promptly made. The fibre insulation used is the best material available at less than prohibitive cost. Satisfactory results are obtainable if the joint receives the kind of attention and care which the character and usage of the device requires, but unfortunately the necessary amount of attention has not often been given in recent years and is now particularly needed to overcome the conditions resulting from increased war-time traffic and speeds, and shortage of track labor.

Qualified by nearly fifty years of close association with the design, manufacture and track service of insulated joints on every road of consequence in the United States and Canada, the writer should be able to

speak plainly of the need for better service conditions and better care of insulated joints than are generally prevalent. Criticisms and complaints of poor service, poor material, or unusual troubles often bear upon their face the evidence that something is at fault other than the joint itself. In fact, careful investigations on the ground over a period of many years have proved that the vast majority of such complaints and troubles have been due to violation of the reasonable requisites governing the intelligent use of insulated joints. The avoidance of such violations and the correction of existing conditions are the only sure way to remove the causes of trouble.

Sketch Showing Correct and Incorrect Application of a Regular-Type Insulated Joint




## Recent Complaints

To corroborate these statements, and in fairness to the joints, several instances of recently reported troubles should be noted, as follows:

(1). *That poor quality fibre was resulting in unduly short life.* Investigation proved the fibre to be of top quality. Actual causes of trouble were low, churning, unequally spaced ties, loose bolts, lack of canted abrasion plates, and running rail due to insufficient anchorage.

(2) *That poor quality fibre in new joints on new rail was resulting in the destruction of fibres within several months.* Investigation proved that there was no fault connected with the fibre, but that a pronounced protuberance at the edges of the rail ends, caused by rail-sawing, had quickly cut into and crushed the fibres, and started its destruction.

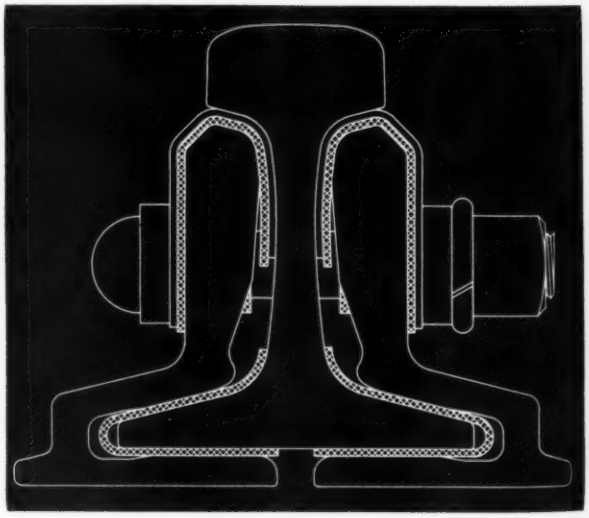
(3) *That fibre base pieces were "creeping" out of joints on newly laid rail and joints.* It developed that the joints were installed by an extra gang unfamiliar with correct methods, that power wrenches were used without sufficiently mauling the base into proper seating position, and that canted abrasion plates were not used, nor were the ties adzed. When the joints were removed and properly reapplied and abrasion plates installed, there was no further trouble.

(4) *Cracked and broken joint bars.* This is an infrequent cause of complaint, and the quantities involved are insignificant compared with the total number of joints in service on any one road. But this kind of trouble often seems serious to the user, even though only several joints break of the thousands in use. Insulated joint bars have been recently redesigned to increase their strength in an effort to avoid any and all breakage. Poor maintenance conditions can be, and undoubtedly are, responsible in many cases. For instance, it is unreasonable, with present speeds and loads to space ties under an insulated joint so that one tie lies under the extreme end of the leaving rail, with the adjoining tie spaced 8 in. to 10 in. or more from the end of the receiving rail. The ties should be spaced at an equal distance from the end of each rail. Again, it should not be expected that an insulated joint will always prove indestructible when applied to the end of a crossing-frog, where conditions are abnormally severe and uniform support often difficult to obtain.

(5) *Cracked and broken rails.* This was a startling complaint when the blame was placed upon the insulated joint. There would seem to be no valid reason for an insulated joint being the sole cause for rail failure unless the joint is so poorly cared for that weaknesses from other causes are enhanced by the insufficient support afforded to the rails by a joint poorly applied or maintained. Failure to renew badly disintegrated head fibres within a reasonable time will naturally result in greatly decreased support of the rail head by joint bars. Similar rail failures have been found at so many locations other than in insulated joints that well informed track engineers have asserted that insulated joints cannot be the prime cause of such failures.

Among other unreasonable complaints may be mentioned damage to insulation by lightning, heat-treating and building-up rail ends; rust and scale on metal parts and distorted fibre parts resulting from joints being stored in the open before installation; short-circuits caused by pieces of foreign metal lodging in joints; damage by dragging equipment. The above instances are noted merely as examples of "special" troubles reported, for which the joint cannot be held responsible, because it is not and cannot be fully fool-proof.

Cross-Section of a Properly-Assembled Armored-Type Insulated Joint



All of the foregoing is intended to be introductory to and explanatory of the vital need for observing the established rules of practice governing the correct installation and maintenance of insulated joints. These rules follow:

(1) Do not apply an insulated joint at chisel cut or battered rail-ends. Such ends will damage the fibre, and by turning rails around or passing them by each other, good rail ends can be placed in the insulated joint.

(2) Before applying joint, remove all sharp edges, scale, rust and dirt from rail ends and joint bars. An application of clean oil to rail ends and joint bars, before assembling the joint, will help resist rust and corrosion.

(3) Do not hang joint on one rail and heel other rail into joint, as the fibre is liable to be damaged.

(4) Do not attempt to apply joint when the opening between the rails is too great. Close up the opening until it is filled by the fibre end post. Otherwise, damage results to the bolts and fibre bushings.

(5) If it is necessary to force rails apart with a chisel, use one that is wider than the rail head and has a small taper. Do not use a track chisel.

(6) Do not drive a bolt through a fibre bushing, or it will damage the bushing. If rails and joint parts are in proper position and bolt holes lined up, the bolts can be easily inserted by hand.

(7) Be sure that the fibre end-post is the same section as the rail; if it projects above the top of the rail, trim it off carefully, flush with the top of rail, before the first train runs over it. This will prevent its being crushed and opened to the weather. An end-post which is made slightly lower than top of rail will be free from damage by wheels and from the operation of removing lips from rail ends.

(8) Support the joint *equally* on smooth-face, sound ties and keep the joint ties and shoulder ties especially well tamped at all times on well-drained, clean ballast. Otherwise, pumping and churning will result in excessive fibre wear. If rails are laid on canted tie plates, a special abrasion plate, having the same cant, should be used on each tie under the insulated joint. Otherwise, the resulting twist given to the rails and joint under wheel loads will increase the wear on insulation and cause the base of the joint to cut into the ties.

(9) Keep all bolts tight at all times, and tighten them frequently after the joint is first applied, until all parts get firmly set. The lower shoulder of each bar should be tapped all along its length with a maul when tightening bolts. This is to avoid a cocked joint and to secure even bearing on all insulation. In applying and maintaining a joint, keep the two center bolts slightly tighter than the others.

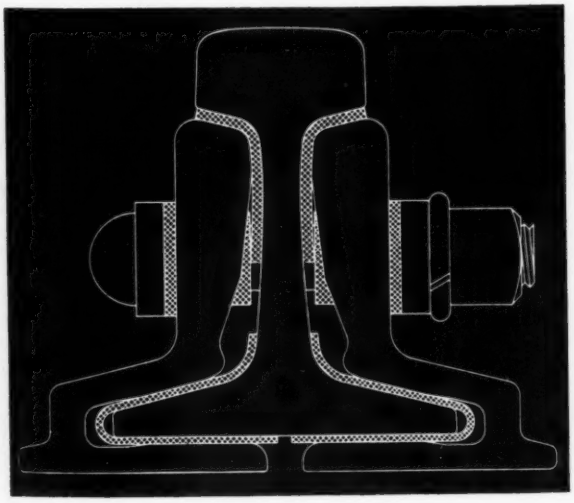
(10) A power wrench must not be used at any time on an insulated joint, as it interferes with the necessary mauling of the base and produces a cocked joint; it is also liable to damage bolts, washer-plates and other parts. Always use a hand wrench.

(11) If the track creeps so as to reduce or increase the opening between rail ends, drive the rails back and apply sufficient rail anchors each side of the insulated joint to stop the creeping. Fibre cannot stand up against the crushing forces of creeping track.

(12) In removing lips from rail ends, care must be used to avoid damaging the fibre end post.

(13) Keep all joint parts dry and clean when not in use. Rusted bars and weathered fibre give poor results. Fibre will change its shape when exposed to weather or to considerable dampness when not confined in the joint. Such deformed fibre produces an ill-fitting joint, resulting in shortened life for the insulation.

(14) The heat treating or building up of rail ends will burn the fibre and render it unfit for further service. Either the insulated joint must be removed before doing such work or all insulation must be renewed immediately after completion of the work.



Cross-Section of a Correctly-Assembled Regular-Type Insulated Joint

Each of the above rules is vital to the economical functioning of an insulated joint. Failure to observe any one or more will tend to shorten the life of the insulation and reduce the efficiency of the joint. The additional time spent in careful installation and in periodically remedying defects in maintenance will prove, in the long run, more economical in labor and material than the frequent removal of the joint bars and replacement of worn fibres occasioned by careless methods and neglect. In addition, an insulated joint kept in good condition can be depended upon to function properly and prevent damage to the rail ends. As evidence of the difference between a joint properly cared for and a neglected one, I have seen fibres remain intact for ten years on heavy-service, main line track that is well maintained; and on the same road, with the same rail section, I have seen fibres worn out and requiring renewal after six months service, due to poor maintenance conditions. This does not mean that the average life of fibre can be expected to reach ten years, but it does mean that very short life is an unwarranted expense.

### Origin of Rules

The above rules originated more than 35 years ago from the experience and observations of a group trained in this subject, and remain basically unchanged, except for some additions necessitated by changes in track methods. These rules were incorporated in an article by the writer on the present subject in the publication now known as "Railway Signaling" in 1916, and that article was reprinted and distributed on the railroads. As a result of the interest aroused by the subsequent follow-up campaign, most roads issued the rules to their track and signal forces in their own preferred forms and over the signatures of their responsible officers. Several large roads incorporated them in their "Book of Rules" for maintenance and signal forces.

Much benefit was derived from this publicity, and for some years insulated joint troubles were greatly reduced. On many roads, however, the rules have now been all but lost and forgotten.

It is strongly urged that interest in this subject be revived, and that each road take active steps to reissue the rules to its maintenance forces, in whatever form is preferred, over the signature of the proper officer. One prominent road has recently done this, and it is recalled that the engineer of maintenance on one of our largest roads once remarked that the benefits in these rules were so apparent that he wanted them reissued on his road at least every ten years.

# Close Timing Fe

Bulldozers Starting to Make the Fill Over the Old Track, Which Was Cut at 7:45 A. M.

Completing the Grading on the Fill. A Work Train Stands Ready To Lay the New Track

THE construction of more than 200 ft. of fill, 8 ft. high, and the laying of slightly more than 300 ft. of new track on this fill and its approaches—all of which was completed in less than four hours—featured the cutting-in, during October, of a section of new line of the Missouri Pacific in southern Missouri. This work was part of an extensive grade and curve-reduction program, in which the tracks were relocated to elevations above possible flood levels, near Granite Bend, Mo., 145 mi. south of St. Louis, in a rugged section of the Ozark mountain country.

As the final step in the cut-in project referred to, it was necessary to construct a fill across the old roadbed before it was possible to close a gap of some 200 ft. in the new line. The south end of this gap in the relocated line was at the north entrance of a rock cut, 55 ft. high, while the north end of the gap was on a new fill constructed largely from spoil from the cut. This fill was, in part, constructed in the bed of a stream known as Black river, the channel of which was changed as part of the improvement program. Additional spoil from the cut, in quantity sufficient to close the gap, was piled at each end of the gap in readiness for the final closure.

Prior to the date selected for placing the new line in service, the track forces prefabricated the requisite number of 39-ft. panels of new track,

The Track Was Prefabricated in 39-ft. Panels, Which Were Laid in Place by the Work Train As Soon As the Fill Was Up to Grade

# ng Features Cutting-In of New Line

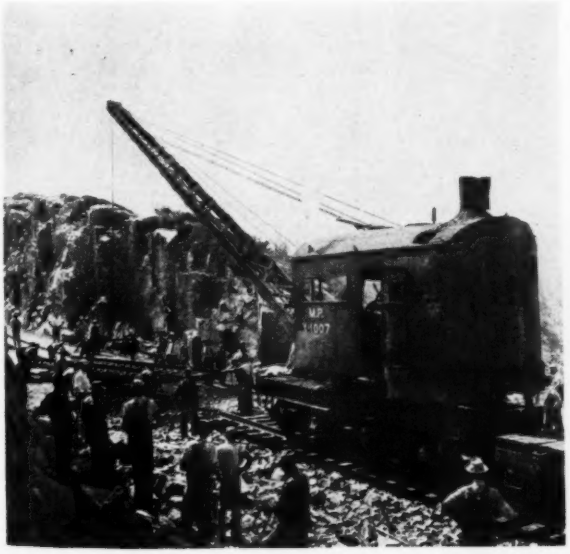
with the joints square, which were assembled at convenient locations along the new line near the site. These panels were built of new 112-lb. rail, fully tie-plated and anchored, and laid on new creosoted ties.

### Bulldozers Help

When all preparations were complete, the old track was closed one morning at 7:45 a.m., immediately after the passage of a northbound passenger train. Heavy bulldozers were brought into action promptly to shove the filling material across the old right of way, compacting it in the process, and shaping the fill to required standards. This phase of the work involved the handling of approximately 450 cu. yd. of material.

Meanwhile, a work train with a locomotive crane was held in readiness at the "end of track" of the new line. Working close behind the bulldozers, this crane moved the prefabricated sections of track into their new positions, while trackmen made the necessary connections, distributed sufficient ballast to hold the surface, and tamped the ties to assure a firm bearing. The last of the prefabricated sections was placed in position at 11:30 a.m.—more than half an hour ahead of schedule—and the first train to traverse the new line, No. 3, the southbound Ozarker, passed at 12:05 p.m., on schedule.

Looking North from the Cut During the Later Stages of the Grading Operation. An Engineer Checks the New Fill, While the Work Train Waits in Position to Lay the Track



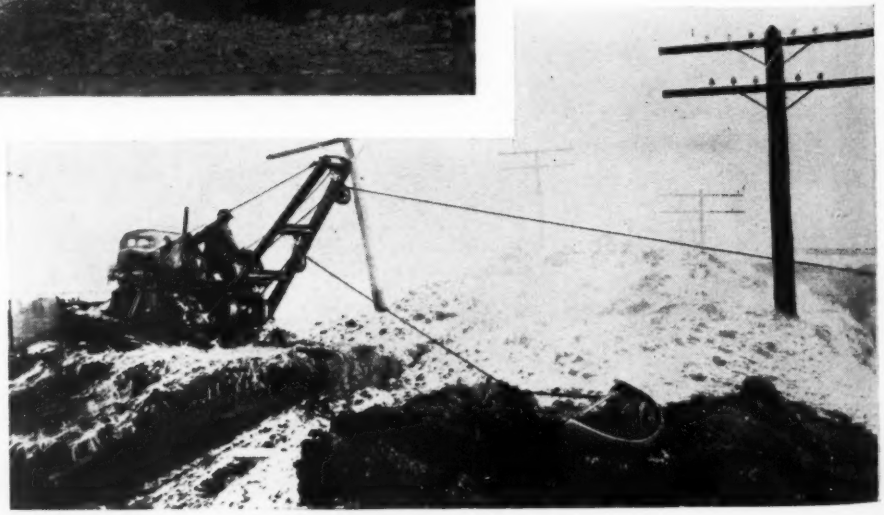
Placing the Last of the Prefabricated Track Panels in Position

The First Train to Pass Over the New Line Goes By at 12:05 P.M.

# Scraper Cleans Choked Bridge O

An Example of the Choked Condition Which Developed at a Number of C. & N. W. Bridges in Western Iowa as a Result of Silt Being Deposited in the Stream Beds

Above—The Same Location as Shown in the Top View After the Silt Deposits Had Been Removed



Right—The Bulldozer-Scraper Unit at Work. Later the Bulldozer Will Spread the Waste Material

THE Chicago and North Western is using scrapers of the open-bottom type, operated from booms and winches on Caterpillar tractors, to clean silt-clogged waterways under bridges, and is finding them much more efficient and economical than earlier methods. Most of this work is being done on the double-track main line of its Iowa division, between Arcadia, Iowa, and Council Bluffs, a distance of approximately 80 mi., where excessive silting requires constant maintenance to keep channels open under bridges and through culverts. In this territory there are some 170 under-track openings, 80 of which are steel bridges with single spans up to 150 ft. in length, with multiple spans over a few wide channels.

The line between Arcadia and Council Bluffs was completed in 1867 and, except for the territory within 20 mi. of Council Bluffs along the Missouri river, lies entirely in the Boyer River valley. The East branch of the Boyer is approximately 20 mi. long from its source at Arcadia, westerly to its junction with the main river at Denison. It has a gradient of 10 ft. per mile and, due to its meandering channel, crosses the railroad seven times.

The Boyer river is about 50 mi. long above Denison and has a gradient of 6 ft. per mile. It flows southerly from its source to Denison, where it joins with the East branch, then flows southwesterly to Missouri valley, where it empties into the Missouri river about 20 mi. north of Council

# Openings Economically

**Open-bottom scrapers, operated from winches mounted on crawler-tractors, are being used effectively by the Chicago & North Western to remove silt deposits from under bridges on its Iowa division. This method, in replacing previous practices, has resulted in considerable savings in time and expense.**

Bluffs. The gradient in the main stream below Denison does not exceed 4 ft. per mile and for the most part is confined to drainage channels up to 200 ft. in width. Throughout the length of the East branch and main stream there are numerous tributaries, both large and small, requiring many culverts and bridges.

### Alluvial Plains

The Boyer valley is a relatively flat alluvial plain, composed predominantly of soil known as loess. This soil is of a wind-blown formation and is readily carried by streams during periods of heavy rain. Throughout the valley are many drainage ditches, installed by local authorities, which have increased the rapidity of run-off. However, where these ditches empty into the river the velocity of the water is materially reduced, with the result that large quantities of silt, carried in suspension, are deposited.

Due to its location along the Boyer, the majority of the bridges and culverts on this line are near the outlets of the various tributaries and, therefore, are subject to excessive silt deposits. At the time the road was built ample clearance was provided under bridges, up to 20 ft. in depth at tributaries and up to 30 ft. over the main stream. However, erosion and general silting of the valley over the years has been so widespread and continuous as to require grade raising at some locations, and the installation of several new bridges, in an effort to prevent damage by washouts. In fact, the depositing of silt during heavy rains is so rapid in some instances as to fill completely the channels under the bridges during a single storm—a condition that requires constant attention to combat the threat of washouts.

### Three Classes

The conditions at the various bridge locations in this area may be readily divided into three distinct classifications insofar as the ease of removing silt is concerned. The first includes those locations where the silt does not fill the entire channel, and sufficient space is left under the bridge after a storm to operate a bulldozer. In the second classification, the silt deposits completely fill the space between the bed of the stream and the underside of the bridge structure, a situation that requires excavating an initial opening under the bridge before using the usual excavating equipment. The third classification includes those locations where the streambeds are of such unstable character as to prohibit the use of the usual types of equipment.

### Previous Methods

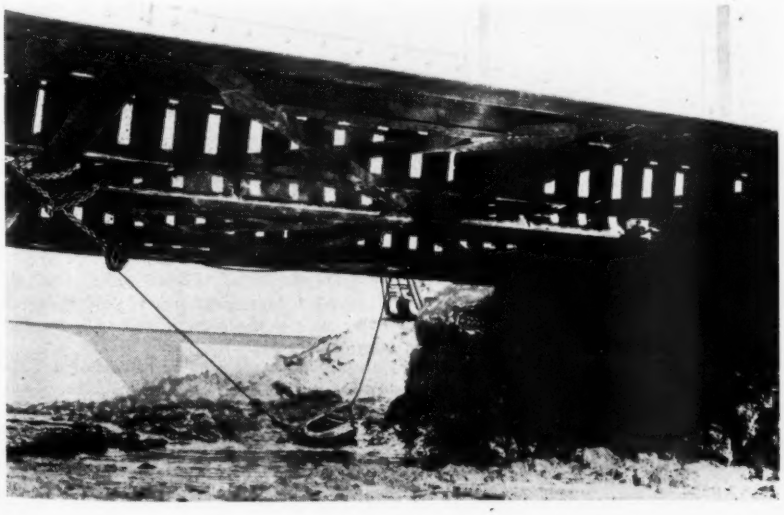
In earlier years, the most common method was to open a space under the bridge with hand shovels, of sufficient width and depth to permit using horses and slips for the cleaning. This was a slow and expensive operation. The bulldozer has replaced the horse and slip method, but has not eliminated the expense of making the initial opening by hand. Furthermore, the bulldozer has not solved the problem at locations included in the third classification—with exceptionally soft bottom.

A program of raising grade and bridges is now in progress at the most troublesome locations to eliminate the danger of washouts due to water flowing over tracks between bridges during high water. This program will also reduce the amount of channel cleaning required in these particular districts; however, channel cleaning will continue to be a major problem in most of the Boyer River valley. To reduce expense and expedite the cleaning work, dozer-scraper units have been employed.

### Scraper Methods

Basically, this equipment consists of a ½-yd. Sauerman, open-bottom Crescent scraper, operated by a Hyster two-way power winch mounted on the rear of a Caterpillar D4 bulldozer. A 10-ft. A-frame boom, equipped with sheaves, is mounted on the rear of the dozer to support and give altitude to the cable at the hoist end. The cable, in a continuous loop, is 150 ft. long, which permits operation of the scraper up to 75 ft. from the winch. This cable is equipped with a sheave and chain at its "out" end for fastening to some fixed point as a "dead-man". The entire unit requires but one man for operation.

In operation, the operator passes the "dead-man" sheave under the bridge and fastens it to some fixed support, such as a buried tie or the far side of the bridge, and then returns to the unit and operates the scraper in an action similar to that of a dragline, bringing the material out from under the bridge. From time to time, as the waste pile near the dozer grows, the dozer blade is used to dispose of the material. Sometimes, the cleared material is removed by draglines, loading into cars, or casting back clear of the channel. Once a space of sufficient size has been dug to permit



**Cleaning Out Under a Bridge Span With the Dozer-Scraper Rig. Note the Cable Anchored to the Bridge Beams and the Scraper in the Stream Bed**

the operation of the dozer under the bridge, the scraper operation is discontinued and the dozer blade is used to remove the balance of the material clogging the channel, except at those locations in the third classification. At these latter locations, where water or the character of the streambed will not permit the use of the dozer, the entire opening is made with the scraper. At some locations, as mentioned previously, the bottom braces at the far side of the bridge are used for anchoring the "out" end of the cable. It is also possible in some cases to operate the scraper directly to the winch, without using the boom. This means of cleaning has also been successful in opening large-size culverts.

### Economical Dirt Moving

Prior to the development of these dozer-scraper units, cleaning under bridges cost approximately 50 cents a cu. yd. Using the dozer-scraper units, the cost has been materially reduced.

At one location, involving a three-track crossing of the Boyer river on a 120-ft. truss span with a 50-ft. through plate-girder flanking span, the cost of moving approximately 5,200 cu. yd. of material was 7 cents per cu. yd. In this instance, the channel under the truss was about half filled in for one-half the length of the span, and the girder span opening was completely clogged. The equipment used here included a D4 dozer equipped with a ½-yd. Crescent scraper, augmented by one D4 and one D6 dozer to dispose of the material in a nearby depression. At another of the larger bridge openings, 3,400 cu. yd. were moved an average of 150 ft. in 16 days, at a cost of 5.2 cents per cu. yd.

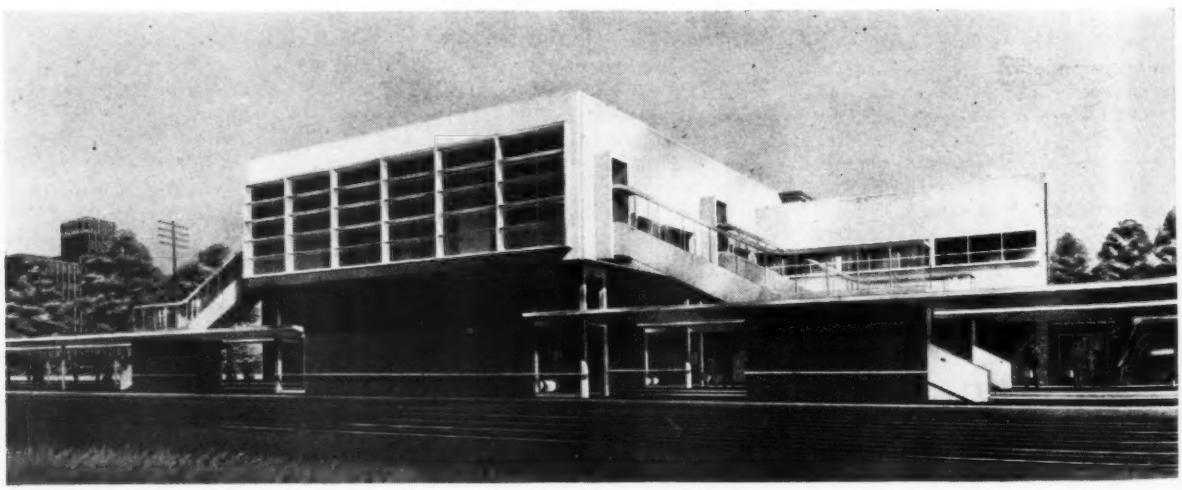
### Other Features

Due to silting and bank erosion along the main channel of the Boyer river, which has caused shifts in the channel at several bridges, three of the bridges are now being replaced to provide longer overall openings. Included in this work is a general grade raise adjacent to the new bridges.

At one location, two 86½-ft. through plate-girder spans are being replaced by a 175-ft. through truss span with a 47½-ft. I-beam flanking span at each end, and the grade is being raised 2 ft. At a second location, a 150-ft. through truss span is being replaced by a 190-ft. through truss span with 47½-ft. I-beam flanking spans. At the third location, two 85-ft. through plate-girder spans are giving way to a 175-ft. through truss span with 47½-ft. I-beam flanking spans, and the grade is being raised 1 ft.

In addition to the above work, two relatively small additional openings are being made and several bridges are being raised from 2 to 4 ft. in conjunction with adjacent grade raises. Furthermore, in an effort to speed up the flow of water under several bridges, and thus minimize silting at these locations, while at the same time prevent erosion, consideration is being given to paving the channels with concrete mats, reinforced with wire mesh—these mats to extend over the entire bed of the stream, from the tip of the upstream wingwalls to the tip of the downstream wingwalls, with a curtain wall at the upstream end, embedded in the streambed to minimize the possibility of undercutting.

The work described in this article is being carried out under the general direction of E. C. Vandenburgh, chief engineer, with the channel clearing work being done by the division forces. The bridge work has been under the direction of A. E. Bechtelheimer, bridge engineer, until his retirement on July 1, and is being carried forward by A. R. Harris, successor to Mr. Bechtelheimer. Development of the dozer-scraper rigs being employed in the channel-cleaning operations has been under the immediate supervision of Harry Mayer, supervisor of scales and work equipment.



## Roanoke Station To Be Reconstructed

*ONE OF THE largest and most interesting passenger-station reconstruction jobs to be carried out in recent years will get under way early in 1948 when the Norfolk & Western expects to start work on a project involving its station at Roanoke, Va. Shown here is an architect's rendering of the reconstructed station as it will appear from the track side. Dominating this side of the station will be a wide concourse, spanning three platforms and four tracks. Where not occupied by large areas of glass the walls of this portion of the structure will be finished in porcelain enamel in attractive colors.*

*Two modern Escalators, completely enclosed, will carry passengers from the station platforms to the concourse. All the platforms and canopies will be reconstructed, the platforms to be resurfaced with concrete and the present umbrella canopies to be replaced with units of the butterfly type.*

*On the street side the entire facade will be refinished and the portico at the main entrance will be lengthend to accommodate four cars. Interior work will include the installation of lunch counters for white and colored patrons; the provision of open ticket counters; the finishing of the walls in the main waiting room with a plastic material having a highly polished surface; and the provision of modern, comfortable seats.*

# Operating Motor Cars *Safely*

## Part I

By G. R. WESTCOTT
Assistant Engineer
Missouri Pacific Lines
St. Louis, Mo.

Even if Rules Permit Running Over a Remote-Controlled Switch, the Speed Should Be Reduced to 3 or 4 M.P.H.

**No. 16 of a Series**

**This is the first half of the last installment of the Motor Car Series that has been appearing periodically in Maintenance since March, 1945. Dealing with safety of operation, based upon the long intimate experience of the author, this installment forms one of the most important and valuable in the entire series. Among other things discussed in Part I are types of accidents, man failures, responsibility, speed, operating through frogs and switches, collision with trains and other motor cars, flagging, hazards at highway crossings, and derailments. Part II will continue the discussion of accidents and proper methods of operation, and will end with a group of 39 highly pertinent rules for operating motor cars safely.**

THERE is an element of hazard in the use of any machine or tool. So simple a tool as a knife may cause an injury; and the more complicated a device becomes, the greater its capacity for destruction.

Yet the fact that such an element of hazard exists does not condemn the use of a device. The automobile may be taken as an example. If uncontrolled or carelessly used, its power for destruction is great; still its usefulness far outweighs the hazards in its operation, as was so forcibly impressed on the American people during World War II when its use was restricted to such a large extent.

The track motor car, like the automobile, has a large capacity for personal injury and destruction if carelessly used; and yet its value in railroad maintenance can scarcely be questioned. It is well, therefore, to examine the hazards in its use and to consider what measures may be taken to avoid them.

To a degree, the hazards may be overcome by careful design, and, where possible, by the application of safety features. The railroads and the manufacturers have worked together well to eliminate defects, and many devices designed to assist in the safe operation of the cars have been developed and applied to them. The hazards in motor car operation arise largely from the manner in which they are used. It is true that the conditions under which they operate are more hazardous than those surrounding the operation of some other types of roadway machines, but much of the danger can be overcome by strict observance of rules and the exercise of care.

### Accidents or Man Failures

What are commonly called motor car accidents fall naturally into two groups. In one group are the true accidents resulting from some condition that could not be foreseen and could not, therefore, be corrected. The number of such accidents is not great, but they do occur at times, usually as the result of a hidden defect in some part. Such a condition is illustrated by a brake failure caused by the twisting of a brake shaft of welded steel tubing on which the weld was poorly made. Factory inspection did not discover this, nor was it apparent to the operator upon reasonably careful examinations. From the operator's standpoint, therefore, the brake failure was truly accidental.

A majority of what are commonly called motor car accidents, however, are not accidents in a true sense, but are due to negligence or lack of care in the operation or maintenance of the car. To illustrate, consider a derailment caused by a broken wheel. If we go back of the immediate cause, we may find that the indirect, but none the less true, cause, was failure to detect the worn condition of the wheel, and correct it. Or consider a derailment resulting from the striking of an obstruction on the rail. Here again the more remote but real cause was the failure to observe the obstruction, or, perhaps, because of speed, being unable to avoid striking it. Most of such so-called accidents are preventable if reasonable care is exercised. Stating it another way, it may be truthfully said that back of what is commonly called a motor care accident there is usually a man failure.

### Who Is Responsible?

The negligence causing accidents rests most often on the operator due to nonobservance of rules, lack of judgment, or heedlessness. Often, however, his superior officer also may be at fault. Generally, the operator will be no more careful than his superior requires, and if he is not cautioned frequently about rule violation, or if he observes the violation of the same rule by his superior, he is very likely to be heedless in his operation. The maintainer, also, may be at fault. If he is not thorough in his periodic inspection of the car, the operator is likely to be no more care-

ful in his daily inspection of the car. It is a well known, but hardly explainable, fact that the average man is more fearful of censure by those in authority over him than he is of the possible injury or even death of himself or his fellow workmen.

### Speed

It is generally agreed that excessive speed is responsible for many of the more serious motor car accidents and a contributing factor in many accidents of a minor nature. Efforts toward the prevention of motor car accidents correctly stress the importance of controlling the speed of operation. For maximum efficiency in the use of a car it is essential that it be operated at as high a speed as is consistent with safety, but safety should be the first consideration.

There is no general agreement on the various railroads as to what the maximum permissible speed for different types of cars should be. The speeds tabulated below are suggested as good practice under general conditions:

| Type of cars | Maximum speed (m.p.h.) |
|---|---|
| Light inspection cars—center load | 25 |
| Gang cars—without trailers | 20 |
| Gang cars—with trailers | 15 |
| Light inspection cars—side load | 15 |
| All cars over highway crossings | 10 |
| All cars through remote-controlled switches or derails | 4 |
| One-man cars around obscure curves | 4 |

No maximum permissible speed is shown for party inspection cars. Such cars vary greatly in size and construction and what would be a reasonable speed in one case would be excessive in another. However, the heaviest and best balanced of such cars can be derailed by a comparatively small obstruction on the rail, and speeds of 50 m.p.h. or more, at which they are frequently operated, can hardly be considered safe.

It is often not understood that the maximum permissible speeds shown in the rules apply only when all conditions are most favorable, and that further speed reductions should be made when conditions are unfavorable. Whether or not there are special instructions covering such conditions, the operator's good judgment should indicate to him where speed should be held below the prescribed maximum.

**If the Man Looking Back is Alert, This Car Will Not Be Struck From the Rear**

The rule sometimes given—that the car shall be under such control that it can be stopped within one-half the range of vision ahead—is not to be depended upon. Obviously, it should not sanction any speed in excess of the established maximum; nor should it apply in considering the possibility of collisions with trains, or often with other motor cars, which may be moving at a much higher speed. It should be kept in mind also that the range of vision is small if an obstruction on the rail capable of derailing the car is considered.

### At Frogs and Switches

Movements through frogs and switches should always be at restricted speed. In a facing-point move through a self-guarded frog, the hazard of derailment is increased since the tread of the motor car wheel is narrower than that of car and locomotive wheels, and the guard flange on the frog does not guide the wheels of the motor car as well as the standard guard rail does.

The operation of a motor car over remote-controlled switches and derails is often forbidden, the rules requiring that the car be stopped and then be pushed over. If this is done there is hazard of the men's feet being caught by the moving parts of the switch if the switch should be thrown when the car is on it. It is probable that running through such switches at walking speed (3 to 4 m.p.h.) involves no more hazard than pushing the car over, and a rule permitting that would be much easier to enforce.

Rules usually provide that cars shall not be run or pushed through spring switches, but shall be lifted over. This may be hard to enforce, but is desirable. Pushing a car through the spring side of a frog in the trailing point direction, instead of running it through, is often required by rule. The wisdom of this for universal observance is to be questioned. Running a light car through the frog at walking speed may occasionally result in derailing the car, but at that speed no damage will be done, ordinarily, beyond the necessity of rerailing the car. Heavy gang cars will usually not be derailed.

Rule violations in connection with speed are more common probably than in any other phase of the handling of motor cars, and the reason is not hard to find. Men are reluctant to observe rules when they question the necessity for them; and when they see the same rules violated by their own supervisors and other officials, which is not uncommon, they are confirmed in their belief that the rules are more restrictive than necessary. The interests of safety would be served much better if the rules were made to restrict activities as little as is consistent with safe operation, and were then enforced against officers and men alike.

### Collisions With Trains

The rules commonly in use for the operation of motor cars call for the displaying of lights and reducing speed when operating at night or in stormy weather; the observing of some types of signals; having one man face the rear when there are two or more men on the car; watching for the smoke or listening for the whistle or the exhaust of an approaching engine; and the securing of a line-up of train movements. The information gained in line-ups and signal indications grants no authority to oc-

cupy the main track at any time or place, but is solely for the purpose of avoiding interference with traffic. Under the various conditions imposed it is often exceedingly difficult to operate safely and at the same time get a gang to and from jobs promptly.

Realizing how difficult it is, under the rules outlined above, to get the cars over the road without delay, and at the same time avoid collisions with trains, some roads are now trying new procedures designed to promote safer operation of the cars. Other roads are considering similar changes, and it is probable that the next few years will see marked changes in the manner of handling motor cars.

Some men develop a sort of sixth sense that helps in avoiding collisions with trains. This, like other senses, however, cannot be depended on if the man is not alert at all times.

## Flagging

There is but one rule by which authority is given to occupy a main track in emergency. That is under flag protection. If all other rules have been observed, and careful consideration of all conditions does not indicate clearly that it is safe to proceed, the only safe course is to run under flag until safer territory has been reached. The rules generally provide that cars of such weight or so heavily loaded that they cannot be removed from the track quickly, must be operated under flag protection. Permission for the nonobservance of this rule may be given where traffic is light and slow and other conditions are favorable.

Proceeding under flag protection may also be required in going around obscure curves or under other conditions where the range of vision ahead is short. Foremen and others are often reluctant to operate under flag protection because it means delaying the progress of their work, and, in addition, may lead to criticism in case an important train is delayed. There is little doubt that more frequent use of flag protection would reduce the number of train and motor car collisions.

Even though the use of flagging equipment as prescribed by the rules may be required infrequently, the need for its use cannot be foreseen, and it is very important, therefore, that the equipment be maintained in good condition at all times. Torpedoes may be exploded by impact with tools or other heavy materials. Fusees exposed to contact with other materials may be damaged so they are not usable when needed. These articles should not be carried in the tool box or battery box, nor in the tool tray of the car; a weather-proof metal container, located so as to be instantly accessible, and having separate compartments for torpedoes and fusees, should be provided on every car. Pieces of scrap air hose attached in a vertical position on the front safety rail are convenient containers for flags rolled up on their staffs. There is often a tendency to neglect lanterns when they are infrequently used. Examination of them, and servicing them if required, should be a regular part of the daily inspection of the car.

## Collisions Between Motor Cars

Collisions between motor cars not infrequently occur, and are sometimes serious from the standpoint of personal injuries and even loss of life. Frequently speed violations are involved, either in exceeding the maximum limit or in failing to reduce speed because of such conditions as poor visibility or wet and slippery rails. Special care is necessary when motor cars are run at night or during foggy weather. If lights are not displayed as required by rule, there is no protection whatever against the collision of cars moving in opposite directions on the same track. If the lights fail, fusees may be used for emergency protection.

The manner of handling the brake may often be involved in motor car collisions. Especially on a wet rail nearly all braking power is lost if the motor car wheels stop turning. For this reason, the power of the engine should not be cut off until the car has been brought nearly to a stop, and the brake should be applied gradually enough to avoid stalling the engine. For the same reason, the engine should be kept in gear when descending grades, especially if the rail is wet.

It must be remembered that a motor car cannot be rolled off the track when the brakes are set. As pointed out in a previous article of this series, the brakes should be arranged so that they will release instantly when pressure on the lever is released, and so that they can be locked in the applied position only by a separate movement by the operator, which he will not likely make when stopping for an emergency removal of the car.

Established rules should govern the spacing of motor cars and trains. These should generally provide that a motor car should not—

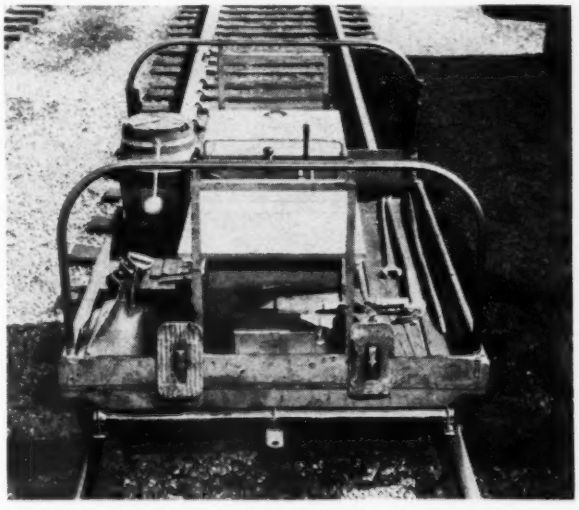
(a) Be stopped closer than 200 ft. from a standing train.

(b) Run closer than 1,000 ft. behind a moving train.

(c) Run closer than 500 ft. behind another moving motor car.

Where one motor car is following another, there should be, if possible, an understanding between the operators as to the movements of both cars, and the operator of the rear car should be constantly on the lookout for signals from the car ahead. Except in emergency, the car in front should not be stopped until signal has been given to the operator of the rear car, and acknowledged by him.

One common rule affecting the possibility of collisions of motor cars with either trains or other motor cars requires that where there are two or more tracks the motor car should move with the current of traffic, and if freight and passenger traffic are separated, it should operate on the freight track. This is a good rule where it is applicable. It is to be noted, however, under centralized-traffic-control operation, neither the direction nor the character of traffic on a given stretch of track can be depended on. In any case, the operator cannot



**Tight Tool Trays and Proper Stowing of Tools Are Essential to Safety**

rely safely on this rule and ignore the more general rule that trains or other motor cars are to be expected "at any time, on any track, from either direction."

### Highway Crossing Accidents

The one best rule for avoiding collisions between motor cars and highway vehicles at grade crossings is that the highway traffic is to be given the right of way. If this is kept in mind the motor car will always approach the crossing under complete control, and, if necessary, be stopped until the way is safe for movement over the crossing. The only exception to this rule would be where the highway traffic is so heavy that it would have to be flagged down while the motor car is pushed across.

**Flagging Highway Traffic May Be Necessary if It Is Heavy; Otherwise It Should Be Given The Right of Way**

The speed of a highway vehicle approaching the crossing cannot be judged accurately, and the amount of time the operator may have to maneuver his car over the crossing in the face of an approaching vehicle may be very small. This is illustrated by the accompanying table which sets up the time in seconds required for traveling various distances at various speeds.

From the table it will be noted that if the motor car is only 100 ft. from the crossing and is traveling at 7½ m.p.h. it will reach the crossing at the same time as an automobile 1,000 ft. away traveling at 75 m.p.h. Or if 100 ft. away and traveling at 15 m.p.h.. it will be hit by an automobile 500 ft. distant traveling at 75 m.p.h.

### Motor Car Derailments

The four principal factors contributing to the derailment of motor cars are: the speed of the car; failure to observe the track ahead of the car; poor condition of the car; and improper loading of tools or other materials. Often more than one of these factors may be involved. Excessive speed especially is likely to be coupled with the other factors in causing a derailment. An obstruction on the rail, when approached at high speed, may not be observed in time to avoid striking it. A car may withstand the strains of operation at reasonable speeds but fail in some part under the additional strains caused by excessive speeds. Even carelessly loaded tools may cause no trouble at normal speeds, but be jolted off at high speeds. The results of a derailment at high speed, also, are likely to be more serious in both personal injury and property damage, than one occurring at low speed.

### Watch the Rails Ahead

The rails ahead of the car should be watched carefully at all times for possible obstructions that might derail the car. The operator should keep such a lookout, but should also be prepared to stop on signal from any other rider on the car who has seen something the operator has missed. The restriction of speed to eight or ten miles per hour over road crossings, included in the rules of some railroads, is based largely on the thought of preventing derailments because of obstructions left on the rail or in the flangeways by vehicular traffic.

A similar lookout must be kept to avoid striking animals. Small animals, such as hogs or dogs, are likely to be hidden from view by the vegetation on the right of way, and when startled by the sudden approach of the car, will attempt to run across the track. Where such an animal is seen, perhaps so far from the track as to arouse no concern, others may be close by.

A poorly maintained car is more likely to be derailed than one in good condition. Among the causes may be worn wheel flanges, bent axles, loose frame bolts, and poorly-adjusted or loose thrust collars. Safety as well as economical operation requires that the car be well maintained.

### Load Tools Carefully

The careless loading of tools on the car is a frequent cause of derailing the car. Even if the car is equipped with suitable tool guards, carelessly loaded tools may still slip from their position and fall in front of the wheels. Just how the tools are to be stowed on the car will depend on the number and character of them, but in stowing them sufficient care should be given to avoid any possibility of their slipping off. If the car is heavily loaded it may be necessary to secure some tools by tying or strapping.

If the rules permit operating the car backward, it is obvious that tool guards should be provided on both front and rear alike. The sides of the seat deck should be housed so that tools cannot drop through into the engine or to the ground. Long slender bars falling through in this way have caused serious injuries to men on the car, although the car was not derailed.

The tool tray should be tight, so that small tools and parts cannot fall through. Even then a small wooden box should be provided in which track bolts and nuts, track spikes and other small materials can be carried. Such small parts in the bottom of the tool tray encourage the shifting of the larger tools.

The weekly removal of all tools and equipment from the car and the replacement of only those articles required for the work to be done next has been recommended as good housekeeping. It is also a safety measure.

**Time in Seconds for Traveling Various Distances at Various Speeds**

| Distance | 7½ m.p.h. (11 ft. per sec.) | 15 m.p.h. (22 ft. per sec.) | 30 m.p.h. (44 ft. per sec.) | 45 m.p.h. (66 ft. per sec.) | 60 m.p.h. (88 ft. per sec.) | 75 m.p.h. (110 ft. per sec.) |
|---|---|---|---|---|---|---|
| 100 ft. | 9.1 sec. | 4.5 sec. | 2.3 sec. | 1.5 sec. | 1.1 sec. | 0.9 sec. |
| 200 ft. | 18.2 sec. | 9.1 sec. | 4.5 sec. | 3.0 sec. | 2.3 sec. | 1.8 sec. |
| 500 ft. | 45.4 sec. | 22.7 sec. | 11.4 sec. | 7.6 sec. | 5.7 sec. | 4.5 sec. |
| 1,000 ft. | 90.9 sec. | 45.5 sec. | 22.7 sec. | 15.2 sec. | 11.4 sec. | 9.1 sec. |

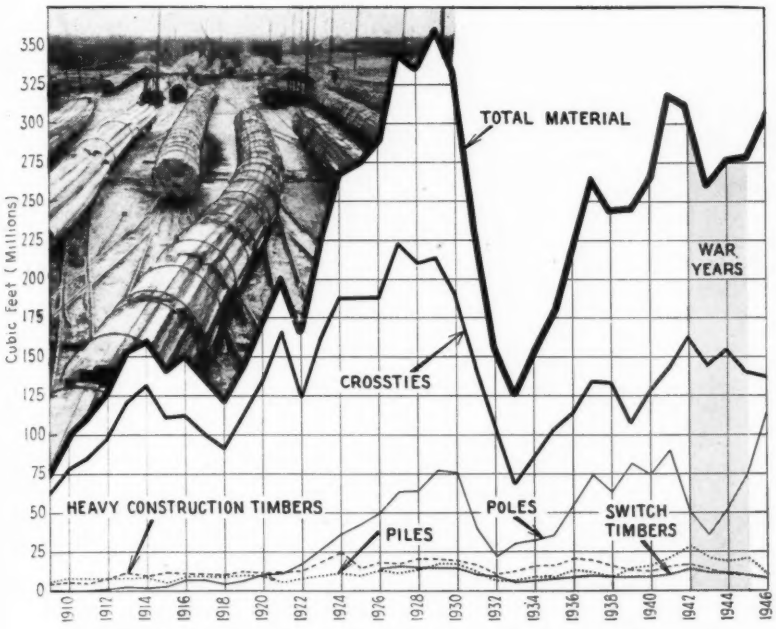



Chart Showing Amount of Wood Treated in Various Categories Since 1909

# Wood Preservation Continues Upward Trend

**The amount of wood given preservative treatment during 1946 rose 10 per cent above that of 1945, to a total of 307,713,660 cu. ft., according to statistics compiled under the direction of Henry B. Steer of the Forest Service of the United States Department of Agriculture in cooperation with the American Wood-Preservers' Association. This is the first time since 1915 that such data have not been assembled by R. K. Helpenstine, Jr., who is now retired from government service.**

THAT wood preservation raised itself a notch in 1946 to a point where the total amount of wood treated has been exceeded only twice since 1930, and only six times in the 38 years statistics have been kept of its growth, can be attributed to only one thing—a 55 per cent increase in the volume of poles treated. This is said because, while poles rose to an all-time high of 6,546,116, all other classifications slumped except the relatively small amount of wood blocks and miscellaneous, small material.

Should the rapidly increasing amount of poles treated continue to gain at a rate equal to that of the last several years, crossties will lose their leadership as the largest class of material given preservative treatment. This year, crossties dropped 2 per cent below the number treated in 1945, to a total of only 45,691,177. A decrease of more than 2,000,000 in the number of Douglas fir ties treated, combined with an increase of over 1,000,000 gum ties, caused these two species to exchange places in the standing.

The 1946 report lists 32,769,511 crossties as having been adzed and/or bored and 12,921,666 as neither adzed nor bored. No segregation was made as to the number that were adzed and not bored or that were bored but not adzed.

In spite of a shortage of creosote, approximately the same number of crossties were treated with that preservative in 1946 as in 1945. Fewer ties, however, were treated with a mixture of creosote and petroleum, and only 1,000 were treated with Wolman salts. To make up for these differences, creosote - petroleum-copper naphthenate, petroleum-pentachlorophenol, and creosote-petroleum-pentachlorophenol were used as preservatives for the first time.

The treatment of switch ties during 1946 followed closely the pattern of 1945, except that the amount was 24 per cent less, and, as in the case of crossties, several new preservatives were used.

### Fire Retardant Treatment

While the fire-retardant treatment of wood has dropped far below its peak year (1943), when war construction was at its peak, the civilian use continues to be relatively large. Having crammed the equivalent of many years of experience into a few war years, fire-retardant treated wood continues in large demand as evidenced by the 4,466,565 ft. b.m. treated in 1946.

The consumption of preservatives by the wood-preserving industry was marked by several significant changes during 1946, some of which have been already indicated. (1) Less creosote and creosote-coal-tar solutions were used; (2) Creosote-petroleum-pentachlorophenol, petroleum-pentachlorophenol, and creosote-petroleum-copper naphthenate among the liquids, and copper naphthenate among the dry preservatives, were used for the first time; and (3) Imported creosote was reported (officially) as usel for the first time since 1943. However, some question of doubt exists as to whether imported creosote was not used in 1945 and unwittingly reported as domestic.

**Crossties Treated by Kind of Wood and Preservative—1946**
(Quantity—number of ties)

| Kind of wood | Creosote[1] | Creosote petroleum[2] | Creosote petroleum copper naphthenate | Zinc chloride | Miscellaneous preservatives | Total | Per cent of total |
|---|---|---|---|---|---|---|---|
| Oak | 11,718,034 | 3,963,929 | 494,566 | ..... | 8,475 | 16,185,004 | 35.42 |
| Southern pine | 8,935,865 | 3,675,251 | 354,556 | ..... | 24,004 | 12,989,676 | 28.43 |
| Gum | 3,531,903 | 1,504,413 | 475,734 | ..... | 6,839 | 5,518,889 | 12.08 |
| Douglas fir | 1,055,886 | 2,932,293 | ..... | ..... | 84,724 | 4,072,903 | 8.91 |
| Beech | 632,700 | 462,830 | 32,429 | ..... | 820 | 1,128,779 | 2.47 |
| Maple | 463,700 | 562,906 | 14,832 | ..... | 820 | 1,041,918 | 2.28 |
| Larch-tamarack | ..... | 990,244 | ..... | ..... | ..... | 990,244 | 2.17 |
| Birch | 250,567 | 412,906 | 13,332 | ..... | ..... | 676,805 | 1.48 |
| Lodgepole pine | 11,946 | 439,367 | ..... | 179,404 | ..... | 630,171 | 1.38 |
| Ponderosa pine | ..... | 549,279 | ..... | ..... | ..... | 549,279 | 1.20 |
| Hemlock | 5,371 | 329,478 | ..... | ..... | 15,651 | 350,500 | 0.77 |
| Elm | 116,179 | 81,176 | 6,652 | ..... | ..... | 204,007 | 0.45 |
| All other | 679,409 | 568,566 | 67,607 | ..... | 36,874 | 1,352,456 | 2.96 |
| Total | 27,401,220 | 16,472,638 | 1,459,708 | 179,404 | 178,207 | 45,691,177 | ..... |
| Per cent of total | 59.97 | 36.05 | 3.20 | 0.39 | 0.39 | ..... | 100.00 |

[1]Includes distillate coal-tar creosote and solutions of creosote and coal tar.
[2]Includes various-percentage solutions of creosote and petroleum.

# Motor Car Causes Derailment—One Dead

FAILURE to provide adequate protection for the movement of a motor car was cited by the Interstate Commerce Commission as the cause of an accident in which the motor car, standing on a track of the New York Central's main line near Huron, Ohio, was struck by a passenger train. As a result of the collision, which occurred on June 5, 1947, 11 of the 13 cars in the passenger train were derailed, the engineman was killed, 11 other persons were injured and the motor car was demolished. The accident occurred during clear weather. An abstract of the commission's report on its investigation of this accident follows.

The accident occurred on a double-track section of the Toledo division of the New York Central, over which trains moving with the current of traffic are controlled by signal indications and an automatic train stop system. The motor car was standing on No. 1 Track, the westward track, near the west end of a 1-deg. 8-min. curve and at a highway grade crossing known as River Road crossing.

Rules governing the operation of track motor cars on this road require the operators to obtain information concerning train and engine movements—this to be in writing when practicable—but the instructions do not relieve the operators from insuring full protection of the motor cars. When conditions require, protection from the train dispatcher must be obtained.

### Circumstances

The investigation disclosed that immediately prior to the accident an assistant supervisor of bridges and buildings and a bridge carpenter were making an inspection of highway grade crossings, using a track motor car for transportation. About 1:50 p.m., while at Ceylon, 3.64 mi. east of Huron, the assistant supervisor communicated with the dispatcher by telephone and obtained a line-up of train movements. This line-up included the information that train No. 135, a westward express train, had departed from Elyria Junction, 24.4 mi. east of the point of accident, and that train No. 251, a westward passenger train would follow. Two operators who were listening to the conversation stated that the dispatcher instructed the assistant supervisor to keep the motor car clear of Track No. 1.

The motor car departed from Ceylon about 1:55 p.m. and proceeded westward on Track No. 1, moving 3.26 mi. to a highway crossing where the motor car was removed to clear for No. 135. After No. 135 had passed, the motor car was again placed on Track No. 1 and departed westward about 2:12 p.m., without the assistant supervisor having obtained further information or instructions regarding other trains on Track 1, although a telephone is located at that crossing. A few minutes later the motor car arrived at River road, and stopped so that the assistant supervisor could inspect the crossing. About one minute later the motor car was struck by No. 251, while the train was moving at a speed estimated at 76 m.p.h.

### Tried to Remove Car

The assistant supervisor and the bridge carpenter stated that when they saw the train approaching it was about 2,000 ft. distant, and they promptly attempted to remove the motor car from the track. However, the car was struck before all the wheels were removed from the rails.

From the circumstances of the accident it was concluded that apparently the engineman, who was killed, did not see the motor car and was not aware that it had been struck by the engine. In the investigation, the assistant supervisor of bridges said that flag protection was not provided because he was desirous of avoiding delay to trains. He added that he thought the motor car could be removed from the track when an approaching train was observed and in time to avert a collision. With regard to the line-up, he stated that he did not hear the dispatcher instruct him to keep the motor car clear of Track No. 1 and he thought there was sufficient time remaining for the motor car to proceed ahead of No. 251 between the two road crossings. He could assign no reason why the motor car was not removed immediately upon arrival at River road.

The commission found that the accident was caused by the failure to provide adequate protection for the movement of the track motor car, pointing out that, in the instant case, the crew of the train had no information regarding the motor car, and that, while the rules of this carrier contain manual block-system rules for the blocking of trains, these rules are not used to provide protection for motor cars. The commission recommended that the New York Central provide adequate block-signal or train-order protection for the movement of track motor cars on its line.

## Only a Dream

TRACK men of all ranks, whether foremen or engineers maintenance of way, will read with a chuckle the poem printed below, which describes a track foreman's astonishment when a trainmaster, an engineman and a master mechanic all attempt to take the responsibility for a derailment, holding that the track was blameless. Written by Albert T. Pearson, formerly a passenger conductor on the Monon, and now deceased, the poem is reprinted from the September, 1947, issue of the Monon Magazine.

#### Section Foreman's Dream

Extra seventy-four six went into the ditch
At the switch just south of the tower,
And ten cars went down the bank,
And held Number Eight for an hour.

They called us all on the carpet
The G.M. was sore it would seem,
Thought they'd give me the walk
Till they started to talk
Then I knew it was only a dream.

With his hand on the engineer's shoulder
The trainmaster said with a sigh,
It was not a low joint
Or a battered switch point,
He was taking the *puzzle* in high.

Then the engineer said with conviction,
I can prove by the man in the tower
When he gave me the ball
I was rocking them all,
And rolling them sixty an hour.

The master mechanic yelled loudly
If you'll let me I'll prove in a jiff
My department's to blame,
I acknowledge with shame
That the engine was rigid and stiff.

I'm not much at visions or dreaming
It's seldom I sleep on my back,
I can side-step and scheme,
But it sure is a dream
When they don't put the blame on the track.

# What's the ANSWER?

## Disseminating Material Prices

*How important is it that the track forces appreciate the present high cost of materials? How can this information be best disseminated among them?*

### Necessary for Supervisors

By G. A. Goerner
General Storekeeper, Chicago, Burlington & Quincy, Chicago

Unless the user of materials fully appreciates present-day high costs, there is certain to be a waste of materials, resulting in loss to the railroad beyond that which would occur if he is made price conscious.

As to how to impress the workman with the cost of the materials he uses is problematical. Some men have the interest of their employer at heart, but many feel no responsibility for the efficient or economical performance of their work. Some years ago, several railroads tried to impress mechanics, working on locomotives, with the prices of the materials they used. Stores department personnel, when issuing the materials, told mechanics the prices of them. The general disinterest on the part of most of these men caused the effort to educate them on prices to be dropped as a failure.

The next move was to instruct the foremen and other supervisors. Here, a greater interest was shown. Many foremen welcome such information, especially if they are responsible for the economy of their department.

Trying to educate track forces on costs of materials would, undoubtedly, have similar results. The average track laborer cares little about the cost of the material he applies. Foremen, roadmasters and division engineers, however, could be made price conscious. They should know the value of the various materials they use.

With such knowledge, supervisors are in a better position to decide whether material should be replaced or should serve longer—provided no hazard is involved in getting the additional wear. On the contrary, a knowledge of material values may effect a decision to replace material rather than to try to continue it in service. We have found cases where men have spent more for labor to make old material serve longer than it would have cost to replace it.

A pamphlet listing in alphabetical order the prices of the major items of track material would serve as cost information to those in charge of track work. The prices need not be the very latest. A general idea of the value of materials is all that is needed. To know that a pair of 112-lb. angle bars costs about $2.60, and that a No. 7, 1-in. by 5½-in. track bolt costs about 15 cents, should be sufficient to guide the judgment of the supervisor in the efficient operation of his territory.

### Cost Is Men's Problem Too

By R. L. Baucom
Engineering Department, Missouri Pacific, St. Louis, Mo.

The importance of insuring that the track forces have a proper appreciation of the high cost of materials should not be underestimated. With railroad managements confronted with continually increasing material costs, it behooves every worker to see that no material is wasted and that proper application and use are made of every piece of material available.

Information regarding the high cost of material can be disseminated by verbal instructions to the men by the roadmaster or supervisor, by letters written to each worker on his territory, or to the foremen, who can, in turn, pass on the information. These instructions should cite the present costs of various materials and their

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**Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.**

### To Be Answered In February Issue

1. *What are the most effective ways to provide an adequate quantity of cool and sanitary drinking water for section gangs? Extra gangs? Explain.*
2. *How can concrete for use in station platforms and driveways be made resistive to the adverse effects of salt and calcium chloride used for ice removal? Explain.*
3. *When new rail is being installed in long stretches of track, including interlockings and outlying switches, should the switch work be done prior to, during, or following the rail laying? Why?*
4. *When additional cover plates are added to existing plate-girder bridges, what advantages are there in prestressing them? How can this be accomplished?*
5. *What are the latest developments in methods of controlling vegetation and woody growths? Can they be used effectively on railway right of ways? How?*
6. *What is an altitude valve? Under what circumstances is its use indicated at water stations? Explain.*
7. *What are the most prevalent types of rail failures occurring in highway crossings? What causes these failures? What can be done to reduce them?*
8. *To what extent can the science of color be applied to the interiors of railway stations to produce the most beneficial effects on patrons and employees? Explain.*

increases or per cent of increase over previous costs, and should explain in detail the savings which can be accomplished by correct application or use of the material on hand. A roadmaster or supervisor may also teach values by visible comparisons of money and small items of material. He may show that two tie plates, or four rail anchors represent a cost of $1 or more; that one spike represents a nickel; that nut-locks cost from three to six cents each. Such examples will show the worker how small a quantity of material can be purchased for the amount of his day's wages. By pointing out to the employee that further increases in material costs might even tend to curtail employment, he will be made to realize how important the problem of avoiding the misuse of materials is to him personally.

If each worker is convinced of the necessity of keeping total material costs down, he will, in turn, have a better understanding of the extent to which material now in use should be kept in present service, placed in other service, or reconditioned to lengthen its service life—within the limit of safety. Railway officers appreciate suggestions from all workers concerning methods which will curtail the purchase and use of materials, especially at today's high costs. This is manifested by management's continued efforts, through large expenditures, to provide the best of materials to secure the maximum of service.

### Cost Consciousness Needed

By H. E. Kirby
Cost Engineer, Chesapeake & Ohio, Richmond, Va.

It is important that track forces and all others who handle materials have some understanding of the present high costs paid by the railroads for these materials. This knowledge, combined with an understanding of the scarcity of most materials and the delays and difficulties encountered in obtaining them, may give a sense of values which can prove of benefit to the individual as well as to his road.

The trackman, along with all others, is aware of the high cost of living. Products—scarce or plentiful—which are brought into his home today are used to the fullest advantage. None is allowed to spoil or be ruined by careless handling or indifferent treatment. Why not consider track and roadway materials in a similar manner? Small track materials, particularly, are subject to loss through carelessness in unloading, distribution and in scrap collection. Other losses result from inattention and negligence in the handling of ballast, ties, switch material and rail. An example of this type of loss is the damage which can be caused by a careless or misdirected hammer blow, as was described in two reports and a letter addressed to the chief engineering officers of the railroads in September, 1944, by the president of the A.R.E.A. These pointed out that one blow of a spike maul will produce cracks in the webs of rails at low temperatures.

Information regarding the present high costs of materials may be given the track forces in several ways. Most directly, the supervisor or his assistant can discuss the matter with each force in going over his territory. It could also be made the object of a special educational campaign. Some roads now issue monthly bulletins on some phase of safety work, placing a copy of the bulletin in the hands of each foreman for reading and discussion for a few minutes before beginning the day's work on a given day of each month. For general enlightenment, this matter of current high costs could well be handled in a similar manner. Advantage might be taken also, again enlisting the foreman's cooperation, of any occasions when the foremen are brought together, such as annual or periodic track inspections, safety meetings, etc.

### Advises Men in the Field

By G. M. O'Rourke
Assistant Engineer Maintenance of Way, Illinois Central, Chicago

We on the Illinois Central think it is very important that the track forces appreciate the present high cost of materials, and it has been our practice for a long time to inform our men of the growing costs, especially of crossties, as we go over the railroad and at staff and "expense" meetings.

We believe that the best way to disseminate such information among them is to discuss it on the ground and at the meetings mentioned above. This, with the accompanying question of increased efficiency, should follow the subject of safety.

A suggestion has been received that a list of current prices of track materials, tools and machines be posted quarterly in section tool houses and extra-gang camp cars. It is being given consideration and may be adopted.

## Radiant-Heated Platforms

*To what extent can radiant heating be used for melting snow on station platforms and driveways? What are the special problems involved? Explain.*

### Snow Too Heavy in Canada

By L. H. Laffoley
Engineer of Buildings, Canadian Pacific, Montreal, Que.

At most station locations in Canada, climatic conditions, where annual snowfalls of 150 in. and over are not unusual, make snow removal by radiant heating both impractical and uneconomical.

To remove snow from a station platform with the before-mentioned amounts of snowfall would tend to create icing conditions along or near the edge of the platform, which would be particularly dangerous. To avoid such icing conditions the platforms would have to be specially dished toward drains and these drains, in turn would have to be designed so that they would not freeze.

It is estimated that snow removal from a platform 200 ft. long by 8 ft. wide, assuming the heating to be used one-sixth of the time for snow removal and with 50 per cent load during the remainder, would require about 3½ tons of coal per month. The cost of this fuel, disregarding the cost of the heating installation, would be considerably more than what is paid for the manual removal of snow.

In cases where exhaust steam might be available, and at certain points where climatic conditions are such that the snowfall is the minimum, such installations might prove practical. I know, however, of no points on our system where these conditions exist, and to my knowledge snow removal from platforms and driveways by this means has never been seriously considered.

### Radiant Heat Is Practical

By George B. Coffey
Division Manager, A. M. Byers Company, Chicago

Any area that is used so much that a railroad sees fit to hire men to remove the snow is one for which, I believe, a radiant-heating snow-melt-

ing system would be economical. This is more evident if the snow has to be loaded on cars or trucks and hauled away, and not merely shoved over to one side. It has been our experience that any snow-removal operations which entail the labor of men and machines is quite expensive; and that a mechanical system, wherein hot water is circulated through pipes embedded in the platform or driveway, will do a much better job at less expense.

The first prerequisite of such a system is that some heat be available in the vicinity. This indicates, in the case of driveways or platforms, the station heating plant. It is estimated that an input of approximately 100 B.t.u. per sq. ft. of area is required to melt 1 ft. of snow per hour. Since snow does not normally fall much faster than that, there would be little or no accumulation, if the system were turned on when the snow started to fall.

The pipe size is determined, in part, by the fact that if the pipe is placed on centers wider than 18 in., some ribbons of snow might be left between the lines of pipe. Therefore, in general, you might say that 1-in. or 1¼-in. pipe, on 18-in. centers, using a water temperature of 140 to 160 deg., will do almost any job.

You will note the reference to "water" in the first paragraph. Our experience has taught us that a water system is best, since it permits the use of an anti-freeze in it, and thus the intermittent operation of the system. If steam is used, trouble from freezing might be experienced as the result of condensate accumulating in traps and other low spots when the system is not operating. There are some installations which use steam, but in most of these the pipe is placed below the concrete, in the fill, rather than embodied in the slab. Also, I believe that a hot water system would have a longer life, since condensates frequently become acid.

If steam is available it may be utilized to heat the water through the use of a small converter or heat exchanger. Circulation can be handled by a centrifugal pump of the type used in forced hot-water heating systems. An automatic control for starting and stopping the system, according to the amount of snowfall, is also available from one of the leading manufacturers of controls and steam specialties.

As a general rule no provision need be made for expansion of the piping, except at construction joints in the concrete, as long as hot water and wrought iron pipe are used, since the latter has a coefficient of expansion almost identical to that of concrete. Regardless of whether the piping is laid in the fill or in the concrete the fill material should not include cinders, slag or other sulphur-bearing material which, in the presence of moisture, might produce acids, which are highly corrosive to all commonly used piping materials.

# Tightening the Gage of Track

*Under what circumstances, if any, is it advisable to maintain the gage of track narrower than 56½ in.? Why?*

## Approves Gage ¼ In. Tight

By C. F. Trowbridge
Assistant Chief Engineer, Pennsylvania, Philadelphia, Pa.

In this era of high labor and material costs, it is helpful to find a specification that will produce better-riding track without incurring additional investment or maintenance expense. Track constructed to the gage that effects the smoothest riding properties costs no more to build or maintain than track constructed to any other usable gage.

Wheel and axle design in this country has been based on 4-ft. 8½-in. track gage. To provide maximum wheel service life, flange wear is permitted within established limits. Consequently, not all pairs of wheels in service have the same dimensions and some may even vary slightly in initial design. Track, switches, frogs and guard rails must, therefore, be designed to support and guide safely rolling stock of slightly variable gage, and at the same time they must provide riding properties which are as smooth as possible.

The engineer is somewhat handicapped in his effort to produce perfect-riding track by this fluctuation in wheel gage. A pair of new wheels, running on new rail laid to standard gage, may have the minimum of 5/8 in. of space in which to move laterally. If the wheels are worn to the limit, the maximum lateral play which develops may be as much as 1 5/8 in.

It is obvious that if this latitude of wheel play can be reduced, better riding properties should result. By making the gage of tangent track 4 ft. 8¼ in., we take up a considerable part of this latitude and still leave an adequate margin of 3/8 in. for "lipping" or rolling of the rail head. Experiments with 4-ft. 8¼-in. gage have indicated, other factors being equal, that tangent track built to this gage has riding properties noticeably superior to that of track that is built to standard gage.

If a car is equipped with wheels of *average* degree of flange wear, and the rail head is rolled to a 1/8-in. lip, the latitude for wheel play is 7/8 in., if the track was laid to standard gage. By tightening the track gage ¼ in., the latitude is reduced to 5/8 in. As the intensity of vibration or lateral impact varies roughly with the square of the distance, the effect of a ¼ in. tightening of track gage is to reduce the sway impact to about half of the amount that would develop on a standard-gage tangent.

It appears, therefore, that better riding track can be obtained at no increase in construction or maintenance cost by adopting a 4-ft. 8¼-in. standard on tangents.

A similar result might be obtained by reducing the tolerance permitted in wheel wear, but this would reduce the service life of wheels, which in consequence would cause material increase in maintenance-of-equipment expenditures.

## Tight Gage on Tangents OK

By T. A. Blair
Assistant Chief Engineer, System, Atchison, Topeka & Santa Fe, Chicago

The established track gage of 56½ in. in comparison with the wheel gage of 55 11/16 in. leaves a distance of 13/32 in. between the rail and the wheel flange at a point 5/8 in. below the running surface. This means that with a worn wheel there is a total lateral movement between wheels and rails of approximately 7/8 in. This is not serious where perfect track conditions exist, but with imperfections in cross level it produces a condition known as "nosing," which aggravates poor riding conditions.

I have observed conditions on tangent track where, owing to tie-plate cutting, the gage had narrowed uniformly as much as ¼ in., with no detrimental effect on the riding qualities of the track.

It is my opinion that for at least tangent track, the standard gage of 56½ in. may well be reduced in order to lessen the lateral movement between the wheels and rail. Of course, the same result will be obtained by increasing the thickness of the wheel flange.

# Warning Men Operating Tampers

*What is the best method of insuring that track gangs using pneumatic tie tampers will hear whistles warning them of the approach of trains?*

## Shut Off Air—Use Whistle

By S. L. Chapin
Safety Supervisor, Southern Pacific, San Francisco, Cal.

The answer is to have one of the gang watchmen stationed at a valve and shut off the air when a train is seen approaching.

A more or less typical set-up for an eight-tool, off-track pneumatic tamping outfit is to have a 50-ft., 1-in. supply hose from the main supply pipe, or portable compressor, leading to a two-way manifold; then two 50-ft. lengths of ¾-in. hose leading to two four-way manifolds, to which are connected the ½-in. hoses leading to the tampers.

If a shut-off valve be placed just ahead of, or made a part of, the first manifold and a gang watchman is assigned to tend this valve, it is a simple matter to shut off the air when a train is seen approaching, thus assuring that the whistle will be heard. The gang watchman tending the valve, as well as other gang watchmen if necessary, and the foreman or assistant foreman directly supervising the tamping, should all be equipped with whistles.

## Installs Another Valve

By Supervisor Track

Because of the inherent noise of operating pneumatic tie tampers, we cannot assure ourselves that every man in a gang will hear a whistle when it is blown, but we can be sure that all will stop work when the source of air to their tools is cut off. With this in mind, it has become the general practice to place a watchman at a valve ahead of the main wye in the supply pipe, so that he can shut off the supply of air from the main reservoir, and then sound his whistle to warn the men that a train approaches.

In some territories where curves are numerous or the view is obstructed, even this system is found to be inadequate. After the valve is shut off there is sufficient air left in the hose beyond the valve to allow the tampers to continue operating momentarily, and only "die-down" gradually. Unfortunately, this same result occurs at other, less dangerous, times when the air compressor is stopped for one reason or another, or when the hose connections are moved ahead, or when the gang stops for lunch, etc. In this way the men do not necessarily associate the stopping of their tools with danger. The whistle must be sounded to complete their warning. However, a whistle sounded immediately after the supply-pipe valve is shut off has to compete with the still-running hammers.

A material improvement can be effected by the addition of a discharge valve installed in conjunction with the regular supply-pipe shut-off valve. A convenient method of installation is to couple a "T" into the tamper side of the supply-pipe valve. Into this "T", screw the new discharge valve. Connect the handles of both valves by a rod having ball and socket ends, and the result is a single-motion, double-acting unit.

As a train approaches, and the valve-watchman shuts off the supply of air, the discharge valve is opened, thus instantly bleeding the tampers, stopping their operation at once. Any whistle, sounded immediately after the valves are operated, will be heard by all the men. There is no dangerous "lag", and no accident.

The use of this valve arrangement has the secondary, added advantage of making it easier, safer, and quicker to disconnect the hoses for moving the line, or for any other reason.

# Welding Bridge-Deck Plates

*When welding steel or wrought iron deck plates to the floorbeams of bridges in connection with ballast deck construction, what procedure should be followed to prevent the plates from buckling? Explain.*

## Cites Many Rules for Work

By A. E. Bechtelheimer
Bridge Engineer (Retired), Chicago & North Western, Chicago

In considering the welding of deck plates to floorbeams, we are dealing with the behavior of structural plates under the influence of localized high temperatures which always causes distortion. The extent and character of the distortion depends primarily upon the relative size and thickness of the plates, the kind of welding, the type of joints, and the welding procedures. In arc welding, the instant the arc is formed, the temperature of the work at the point of the welding and the welding electrode jumps from normal to the vicinity of 6,500 deg. F.

If the jointure could be completed in one to two seconds, expansion and contraction would take place without distortion. In actual practice, however, there is an expanding zone as the weld progresses, followed by a contracting zone as the arc cools. When welding proceeds at a relatively low speed, as with bare wire or small electrodes, the contracting zone is the predominating factor, causing the plates to close up ahead of the arc. When welding at relatively high speeds, as with shielded-arc-type electrodes, the expanding zone is the predominating factor, and causes the plates to open up ahead of the arc. It is obvious then, that the amount of distortion is directly proportional to the length of the jointure line, the size and shape of the bead, the number of passes, and the welding procedure.

The following factors should be considered in the design of welded structural plate floors for ballasted-deck bridges: (1) Keep floor plate areas small, consistent with good arrangement of jointure lines, possibly not more than 16 ft. long and 5 to 6 ft. wide. (2) Keep plate thickness small, consistent with strength, preferably ⅜ in. and not more than ½ in. thick. (3) Use two separate fillet welds rather than one V weld. (4) Avoid multiple-pass welds, consistent with the strength of the weld. (5) Use skip-welding where jointure lines are relatively long, thereby keeping expanding zone narrow, and close to the contracting zone. (6) Use step-back method of welding where jointure lines are relatively short, thereby breaking up the welds into short sections, but in sequence. (7) Where consistent, the direction of welding should be away from the joint of restraint and towards the joint of maximum freedom, that is, welded away from a welding seam at right angles to the welding. (8) Make generous use of plug welding to intermediate beams prior to starting the edge welding. Fillet welding in slotted holes is generally preferable to full

welding in round holes. (9) After completion of plug welding, fasten plate edges by tack welds 3 in. long on 10 to 12-in. centers in a hit and miss fashion, rather than in consecutive order. This procedure approaches intermittent welding, which may in many instances be preferable to continuous welding.

Completely welded structural plate floors rigidly anchored to bridge floor systems are subjected to stresses occasioned by expansion and contraction of the superstructure, hence the designer may find it necessary to provide a floating bridge floor—that is, a floor that permits the proper functioning of a built-in expansion joint.

It is impossible to give rules for controlling all forms of distortion that are usually present in welding, hence each job must be studied to determine the proper procedure to follow for the method of welding employed.

### Prevent Heat Accumulation

By Supervisor of Bridges

The methods of welding either steel or wrought iron deck plates to the floorbeams of railway bridges are similar, except that for wrought iron the welding speed in each operation is decreased slightly below that used for the same thickness of steel. A lower current may also be required for the wrought iron to prevent burning.

The technique to be employed to prevent buckling of the relatively thin plates used in this type of construction must be essentially a method to prevent the accumulation of heat and the accompanying expansion it causes. One procedure which has been found effective embodies three important operations: (1) The plates, arranged in their proper position on the floorbeams, are fastened in place by short tack welds on about 10-in. centers; (2) plug welds are made to intermediate beams; and (3) the seams are completed in the "back-step" or "skip" welding manner. The first two operations are designed to hold the plates down and the last to minimize the heating of the plates.

Care must always be used to carry on the work in accordance with an orderly and predetermined plan. A proved method is to start all the work at the center of the bridge and work simultaneously toward the ends. The welds in each joint are then started on the center line and worked simultaneously toward the girders.

While there is some argument as to whether V or fillet welds are to be used at the seams, both have been used successfully. In the case of V welds, designers usually specify that the plates shall be separated a specific amount and the bevel be such that the gap at the top of each joint should not exceed the thickness of the plates. This, however, is more a matter of obtaining weld quality than a matter of controlling the buckling of the plates.

# Loading Bundles of Crossties

*What are the advantages or disadvantages in having crossties strapped into bundles at the treating plant before being loaded into cars for shipment? Why?*

### Sees Several Advantages

By W. M. S. Dunn
General Roadmaster (System), Nickel Plate, Bellevue, Ohio

The biggest advantage in having crossties strapped into bundles would be the safety feature. We have experienced a great many minor accidents which were caused by men catching fingers, toes, etc., under ties when unloading them from cars—particularly high-side gondolas. If these ties could be unloaded in bundles by a machine this hazard would be eliminated.

If tie renewals are heavy enough, so that the unloading of 20 ties in a bundle at one location would not involve expensive trucking afterward, we would be economically justified in handling them in this manner. However, where scattered tie renewals are made, it would probably necessitate some trucking if ties were unloaded in bundles.

The treating plant, of course, would have to rack the ties in order to secure a chain around the bundle for unloading. The railroad would also have to provide adequate cranes or power machines to unload them. However, I am of the opinion that the additional expense for such machinery would be justified by the savings over the cost of hand unloading.

I believe that not more than 20 ties should be strapped in one bundle and that they should be strapped securely enough to insure the minimum of breakage of the bundles in transit and handling.

### Packaging Not Warranted

By J. I. Hess
Chief Engineer, Forest Products Treating Company, Portland, Ore.

The question of the advisability of strapping crossties into bundles before shipping has come up with us on several occasions but we have never used that method of handling ties and, as far as we know, it is not being used by any treating plant in this area. We do ship a considerable volume of crossties to various railroads within our competitive range on a commercial basis, but the greater portion of ties going through our plant is handled under contract for the Union Pacific and their method of distributing them along their right of way makes it necessary that they be loaded singly.

All of their renewal ties are loaded into gondolas at the plant, crossways of the car. These cars are made up into a work train and the ties are distributed by up-ending them over the side of the car, one at a time, while the work train is moving at a rate per mile determined by the renewal requirements.

In this way, a work train can cover many miles of track in a shift, and it is obvious that having the ties strapped in packages would be a distinct disadvantage. It is conceivable, however, that where the ties are to be unloaded from cars by a crane into a storage yard, this method of bundling might have some merit. We are inclined to doubt it, however, as the cars can be loaded for crane unloading merely by using wood strips to separate the sling loads and thus save the cost of banding and the time of breaking the packages when the ties are being taken for use. We are unable to see any advantages to be gained by bundling crossties that warrant the extra expense involved.

### Bundles Have Advantages

By John F. Renfro
Vice-President, Taylor-Colquitt Company, Spartanburg, S. C.

The advantages of having treated crossties strapped in bundles at the treating plant before loading them into cars are twofold. (1) If the ties are going to be unloaded and stored at destination by crane or other mechanical device, the bundles can be handled at less expense than if the ties were dumped into cars unstrapped. (2) Ties stored at the treating plant yard in this manner can be loaded into cars

by cranes. If it is desired to unload the ties by hand at destination, the straps can be cut after the bundles have been placed in the cars.

If the ties are to be stored at the treating plant before loading into cars for shipment, each bundle should have in it a tie with the grades stenciled thereon to eliminate the necessity for reinspection.

Open-top equipment, preferably high-side, flat-bottom gondolas, are most desirable for loading ties that have been strapped into bundles. It would be extremely difficult to load bundled ties into box or stock cars.

### Banding Helps on New Work

By W. C. L. Jones

Chief Engineer, Walsh Construction Company and Bates & Rogers Construction Corp., Toledo, Ohio

Where approximately 141,000 treated ties are to be installed, as in the construction of the tracks serving the Lakefront Dock and Railroad Terminal Company's coal and ore docks, at Harbor View, Ohio, the safest and most economical method of handling ties is paramount.

After careful study in this case, it was decided to strap or band the ties into bundles of 50 at the treating plant before treating. Two bands were applied per bundle, and 15 tram cars, or 750 ties, were treated at a time. It is desirable, as was done on this project, to have sufficient gondolas assigned to tie service exclusively, so that two 4-in. by 4-in. timber sills, running lengthwise of the cars, can then be fastened to the floors of the cars, thus allowing space for slings to be placed around the bundles for unloading. It is essential that some space be left between bundles for the slings. Where there is a short haul, it may be found desirable to load one bundle less than the capacity of the car, but where the haul is long, a 4-in. by 4-in. spacer between bundles should be used, which will permit the car to be loaded to capacity.

Our bundles were either unloaded in a stock pile or distributed direct from cars along the subgrade by use of slings and a crawler crane. No attempt was made to lift the bundles by the bands. Because the ties were banded it was possible for the crane to distribute them for at least three tracks each side of the unloading track at intervals of about 75 ft. along each track. Thus they had to be carried by hand the minimum distance.

This method of unloading on our job also releases a locomotive for other purposes, as the cars could be spotted and the locomotive cut off. If the ties had been unloaded by hand, not banded, the locomotive could not have been released without causing longer hand-carrying distances. When ties were being taken from the stock pile, they were loaded on flat-bed dump trucks and after which they were distributed, as needed, along the subgrade.

# Foaming of Boiler Water

*What causes foaming of treated water in locomotive boilers? To what extent is it prevalent? What methods are being followed in its control?*

### Caused by Solids

By J. P. Hanley

Assistant Superintendent Water Service, Illinois Central, Chicago

Foaming and priming in boilers may be described as water carry-over of wet steam from the water surface in the boiler to the steam cylinders and other steam actuated parts of the locomotive. It is a very troublesome condition and many methods are used to keep it under control. If this is not done the steam efficiency is decreased, lubrication is impaired or destroyed, and the performance and maintenance of the locomotive is adversely affected.

Foaming is caused by organic or inorganic substances contained in the water, which concentrate in the boiler after each boiler full of water is evaporated and used as steam. The concentrates referred to do not pass off with the steam, but remain in the boiler and progressively increase until the foaming point is reached, unless suitable methods are used to prevent the concentration from reaching that critical point.

The amount of suspended matter and dissolved solids are usually maintained below the foaming point by blowing off a portion of the highly concentrated water and pumping fresh water into the boiler—repeating this dilution at the roundhouse and on road trips to a sufficient extent to secure locomotive operation without carry-over.

Prior to the advent of water treatment, the water in each locomotive was completely changed at the roundhouse after one or more trips, and the boiler refilled with fresh water. With the advance of water treatment it was found more economical to change only a small percentage of the water by blow-off while the locomotive was maintained under steam. With this arrangement, nearly all railways now operate locomotives on a 30-day wash-out interval, which is planned to coincide with the Federal schedule for the internal inspection of locomotive boilers.

Some railways use the continuous blow-off system—which consists of an orifice calibrated to blow off the necessary amount of water continuously. Other railways use an automatic blow-off system, where the foaming bubbles in the boiler contact electric anodes which, in turn, open the blow-off valve automatically. The latter system is often used with signal lights, which go on and off in the locomotive cab as the foaming bubbles become critical and non-critical. Still other railways, where foaming is serious, use metal deflectors, foam troughs, and other mechanical apparatus inside the boiler to intercept or baffle the passage of the foam bubbles into the throttle valve of the locomotive.

Nearly all railways use some form of anti-foam compound to assist in decreasing the amount of blow-off required. The earliest, and for many years the best known, compound was composed of an emulsion of castor oil and tannin. In recent years other forms of anti-foam compounds of the amine type have been developed by reputable chemical companies. These compounds can be applied conveniently and usually give satisfactory results.

In recent years it has been found economical to carry higher concentrations in boiler water than was done in pre-war years, and for this reason the increased use of anti-foam compound is frequently justified. If the critical foaming point in locomotives can be raised substantially, less hot water will be blown off. This in turn saves water, fuel, and chemicals, and usually gives more satisfactory water-carrying conditions in the locomotive boiler. Water engineers should estimate these benefits against the extra cost of the anti-foam compound, and use the latter where it is justified.

### Induced by Sodium Salts

By Water Engineer

Foaming, as defined by the Water Service committee of the American Railway Engineering Association, is the term applied to the action in a

boiler when steam bubbles build up over the surface of the water to form a layer of foam which fills the steam space and carries over into the cylinders.

Foaming of treated water is induced primarily by the presence of sodium salts. Chief among these salts, in the order in which they induce foaming, are, sodium carbonate, sodium sulphate and sodium chloride. Suspended matter, both organic and inorganic, in both treated and untreated water, influences foaming to a greater or lesser extent, depending upon the nature of the suspended matter and the amount of dissolved solids present in the water. These impurities appear to increase the film which surrounds the bubbles of steam, and as the bubbles rise to the surface of the water in the boiler, carrying water with them, the films are retained and collect the bubbles to produce foaming conditions.

Foaming may be controlled by two methods, or a combination of both: (1) By blowing down the boiler, thus reducing the concentration of foaming salts below the foaming point; and (2) by the use of anti-foaming treatment to permit higher concentrations. In blowing down boilers consideration must be given to the cost of blowing as compared to the use of anti-foaming treatment.

Based upon figures prepared some years ago, the cost of water blown from locomotive boilers was given as 45 cents per 1,000 gal. blown off. Since these figures were prepared, the cost of water and coal has more than doubled, and it would appear that serious consideration should now be given to the extended use of anti-foaming treatment.

New types of anti-foam treatment have been developed that permit their application in combination with other chemicals used in water treatment. This overcomes the objection to the use of the former types of anti-foam that were applied by hand, which were wasteful and unsatisfactory.

# Heating Railway Buildings

*What are the latest types of heating facilities for use in shops, enginehouses, small stations, etc.? Can any of these be used effectively in combination?*

## Combines Heating Systems

By H. P. Watson
DeLeuw, Cather & Co., Chicago

In working out the details of the design of the new Diesel shop for the Chicago & North Western, we have used a combination of facilities to solve the somewhat complicated heating problem that such a building poses.

The main problem confronting the mechanical designers was a familiar one involving the need for maintaining comfortable conditions in a space where a considerable amount of air would be moving both from mechanical ventilation and infiltration, and to do this job at a minimum cost for installation and operation.

One problem which many railroads have gone to considerable trouble to correct is that of disposing of Diesel engine exhaust fumes. These fumes are low in carbon monoxide and are not particularly toxic, but because of the presence of $SO_2$ the fumes are irritating to the eyes and nasal passages. A simple, and it might be said, ideal, way to dispose of these fumes would be to trap them directly as they leave the engine by an arrangement not too different from a smoke jack in a roundhouse. This would involve the movement of relatively little air through the building. This simple scheme is complicated in a Diesel shop because of the multiplicity of exhaust ports on each engine unit and a total lack of standardization in the location of the ports on various types of engines.

An alternative would be to provide general ventilation of the building. This would involve the moving of a large volume of air, and since replacement air must be heated, the cost of this arrangement would be undesirably high, both initially and for operation.

A compromise scheme was adopted for this building by constructing hoods over sections of each of the service tracks. These hoods are nothing more than baffles constructed in the trusses. One 10,000-c.f.m. power roof ventilator is installed above each hood. It is intended these ventilators will be operated only when a running engine is spotted under the hood which that ventilator serves. There are eight of these hoods.

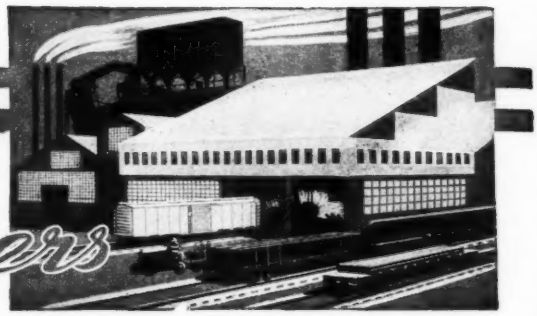
In that part of the shop where it is assumed there will be practically no test running of engines, gravity roof ventilators are installed. There are six of these of the multiple-heat-valve type which, under normal winter conditions, should exhaust a total of 72,000 c.f.m.

A total of 152,000 c.f.m. could thus conceivably be exhausted from the shop. However, all of the gravity ventilators are provided with motor-operated dampers and the power roof ventilators are operated only as needed. Therefore, only 53,000 c.f.m. of heated fresh air is introduced into this space, part of which is introduced through the shops and offices under the platforms, part in the truck drop pit, and part directly into the large area. The introduction of this heated fresh air is accomplished by ventilating units through which fresh air is blown over steam heated coils. Any excess of exhaust over air supply will be made up by infiltration, which will be a problem anyway because of the frequent and prolonged opening of the large doors. In order to compensate for this heat loss and for the normal heat loss through walls, roof and glass, it was decided to install radiant heating coils in the floor. This means of heating will be most effective in maintaining comfortable conditions close to the floor where men are working, and will offer the quickest recovery after a blast of air has passed through the building from open doors. This heating is, of course, supplemented by the excess heat in the ventilation air.

Coils on 12-in. centers with 2½ in. of concrete cover will be laid in the floor. The floor slab is, in general, 6 in. thick. A portion of the coil is 1-in. pipe and the balance 1¼ in. Both grid and continuous coils will be used. Hot water will flow continuously through the coils and the temperature will be controlled by a three-way mixing valve actuated by a room thermostat and an outside controller. Water will be heated by live steam from a central boiler plant through a suitable heat exchanger. The basement of the shops and stores section is also heated by radiant floor coils laid in concrete. The remainder of this section is heated by steam unit heaters.

Under portions of the outside platforms and ramps, where it was believed necessary to eliminate snow and ice in winter, a radiant heating system was installed. This consisted of coils of 1¼-in. pipe laid on 12-in. centers in gravel under the 6-in. concrete slab. Through these pipes, hot water at 167 deg. F. mean temperature will be circulated. Anti-freeze will, of course, be mixed with the circulating water. A thermostatic control will be provided on the heat exchanger to maintain a predetermined hot water temperature, but, otherwise, control of the radiant-heating system will be manual.

# PRODUCTS of Manufacturers



*(For additional information on any of the products described in these columns, use postcards, page 1201)*

## Bridge Jack with Bolt-Puller Device

AN improved Simplex Bridge Jack, of 15 tons capacity, complete with chain and bolt-puller attachment, and suitable for use in many types of work on railway bridges where lining and shimming operations are involved, has recently been introduced by Templeton, Kenly & Co., Chicago. Designated as No. 310, the improved jack is equipped with a base-locking pawl which, when released, permits the jack to be operated from angles up to approximately 30 deg. from the vertical. By wedging the base of the jack, it is possible to operate the jack from any desired angle. This feature is useful when lining or pulling piles or posts. Full-capacity lifts are provided at the toe and at the cap.

The cap is designed to hold ½ BBB chain securely, as shown in the accompanying photograph. A 5-ft. length of this chain is furnished with each jack, and the chain is equipped with a grab hook and a bolt-puller attachment, the latter being designed for pulling bolts with head sizes of ½ in. to ⅞ in. The jack is available with base widths of 3¾ in. or 5 in., as desired. Specifications for the jack include a height of 24¼ in., a 13-in. lift, and a net weight of 66 lb.

**The Simplex No. 310 Bridge Jack Shown With the Chain and Bolt-Puller Attachment. The Jack Is Held from Tipping by Means of a ⅜-In. Chain**

## Earth Drill

THE Buda Company, Harvey, Ill., has announced the development of a new hydraulically-controlled earth drill, designated as Model HBJ, which is said to be capable of drilling holes from 6 to 42 in. in diameter to depths up to 10 ft.

The earth drill is claimed to be ideal for pre-boring holes for piles and poles, for boring foundation holes, and for other jobs which require the constant moving of equipment. It is powered by a slow-speed four-cylinder Buda gasoline engine, which, together with the drilling mechanism, is mounted on an I-beam frame of structural steel. A flat-bed truck or a heavy four-wheel trailer is recommended for mounting the drill. The unit may be quickly removed from the vehicle to permit its use for other purposes.

All special features of this earth-boring machine are said to be engineered to facilitate transportation and to minimize "set-up" time for digging. This latter feature is said to be particularly important in confined areas, where frequent raising and lowering of the tower is necessary. Steady hydraulic power of the machine is said to move the tower into instant operating position. Other controls permit quick adjustment of the drill head to a vertical position. All leveling adjustments for either straight holes or anchor holes are completely hydraulic. A pole-setter tower extension and power-driven winch, furnished as optional construction, comprise a factory-installed part of the unit for power pole work.

**The Buda Model HBJ Hydraulically-Controlled Earth Drill Shown In Position for Drilling an Inclined Hole**

## Explosive Punch For "Drilling" Rails

THE Mine safety Appliances Company, Pittsburgh, Pa., is introducing into the railway fields its Velocity Power Rail Punch; a device which utilizes an explosive blank cartridge to drive a die through the web of the rail as a means of "drilling" the holes for track bolts. It is reported that, with this tool, less than two minutes are required for one man to position and tighten the tool on the rail and fire the cartridge. The finished hole is said to be clean and smooth, free of burrs on both sides and with practically no taper. It is further claimed that no reaming or filing is required and that the holes may be made to the exact size desired. Simplicity of operation is said to enable one man to punch 30 to 40 holes per hour under field conditions.

The punch consists of a high-strength steel casting, or frame, which is shaped somewhat in the form of the letter "U". The punching mechanism, consisting of a piston, a punch unit and a die, is inserted through one arm of the frame, while a somewhat similar unit, containing a bottom die, is inserted in the other arm so that the two units oppose each other. Both of them are threaded.

To punch a hole in a rail, the frame is placed over the rail with the open end down, and the punch unit and the bottom die are then screwed tight against the web of the rail. A .44 or .45-caliber blank cartridge is then inserted in the breech mechanism of the punch unit. A light blow of a hammer on the firing pin explodes the cartridge, and the pressure of the gases released in the explosion drives the piston which, in turn, propels the punch unit through the web of the rail and into the bottom die on the opposite side.

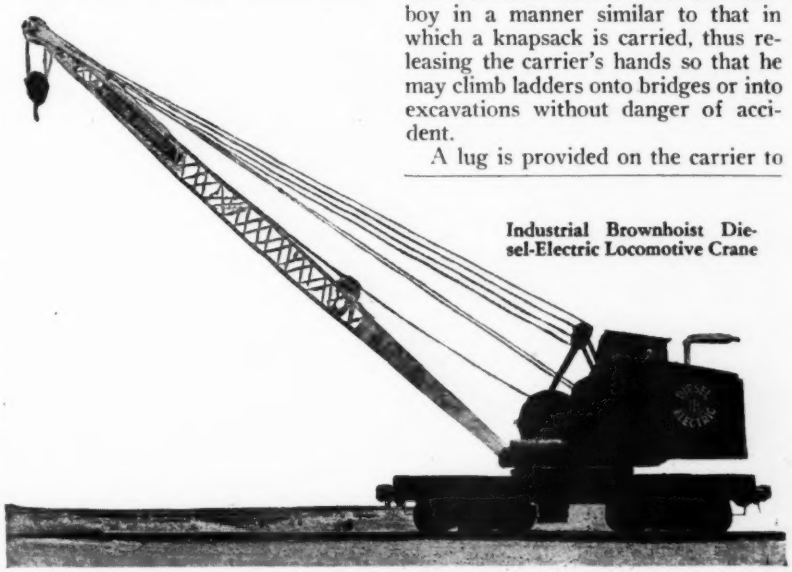
Three models of the velocity power punch are available, these being designated as Models R-40, R-60, and R-110. These punches accommodate, respectively, rail sizes up to 40 lb., 70 lb., and 112 lb. The two smaller models will punch holes up to 7/8 in. in diameter while the larger will punch holes up to 1 1/8 in. in size.

**Showing How the Velocity Power Rail Punch Is Used to "Drill" a Bolt Hole**

## Diesel-Electric Locomotive Cranes

THE Industrial Brownhoist Corporation, Bay City, Mich., has added a series of new Diesel-electric locomotive cranes, in capacities upwards from 30 tons and with travel speeds up to 15 m.p.h., to its line of material-handling equipment. The use of Diesel-electric power for these new units is said to permit power to be transmitted directly to the axles by means of inside-hung, spring-suspended motors, eliminating travel gears, shafting and clutches, and resulting, it is said, in reduced maintenance. In these machines it is pointed out that the power for hoisting, swinging and booming is transmitted directly to the superstructure through a helical gear reducer.

An important design feature is said to be the patented Monitor-type cab that affords the operator unrestricted visibility through 360 deg. Other standard design and construction features include air-operated controls, anti-friction bearings at all essential points, worm-driven boom hoist, and clearance of 14 in. between the rotating bed and the car body to minimize the danger of a person being caught in this space. The crane is available with electric power for revolving.



**Industrial Brownhoist Diesel-Electric Locomotive Crane**

## Water Carrier

THE Dixie Cup Company, Easton, Pa., has recently announced a new portable water carrier, which is intended especially for use in bringing water in a sanitary manner to men engaged in construction work, on survey crews and in railroad maintenance gangs. The carrier is made of stainless steel and is insulated to keep water cool for many hours in the field. It is approximately 18 in. high, 15 in. long, and 8 in. wide and has a capacity of approximately 4 gal. Two adjustable carrying straps are provided so that it can be carried on the back of the water boy in a manner similar to that in which a knapsack is carried, thus releasing the carrier's hands so that he may climb ladders onto bridges or into excavations without danger of accident.

A lug is provided on the carrier to

*(For additional information on any of the products described on this page, use postcards, page 1201)*

accommodate a Vortex paper-cup dispenser so that each drink may be served in an individual paper cup, eliminating the chance for mouth-borne contagion and consequent loss of man-hours. A recessed push-type faucet, which turns off automatically when pressure is released, is provided on the carrier. The unit is finished in olive green with chrome trim.

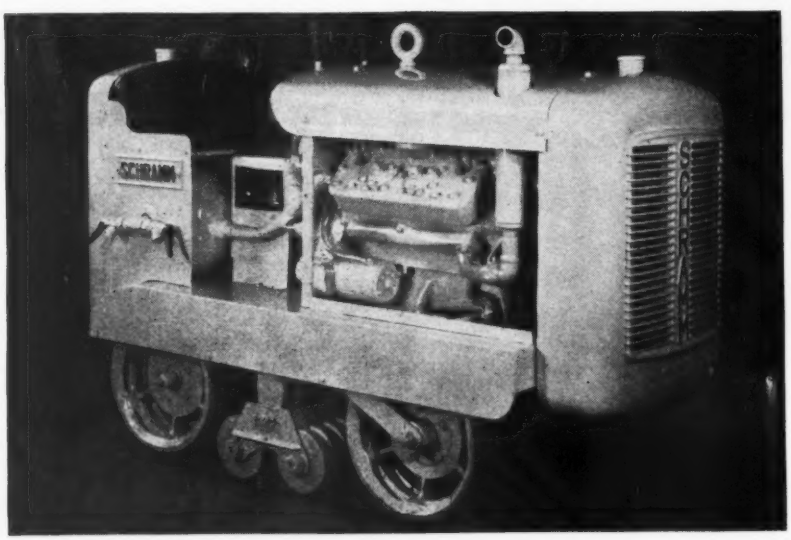
The Dixie Portable Water Carrier

## Crawler Compressor

SCHRAMM, Inc., West Chester, Pa., has recently announced the production of a new crawler-mounted air compressor, designated as Model 60, which is adaptable for use with many types of air-operated tools, and which, in addition, may be used for towing mowers and similar light equipment, for bulldozing or for operating belt-driven equipment of many different types.

The new compressor, which is 33 in. wide, 51 in. high, and 88 in. long, has a track-type mounting in which the treads are formed of continuous rubber belts, made with integral lugs to increase traction, with flexible steel tension cords embedded in the rubber. It is equipped with hydraulic steering and is capable of operating at speeds of 1 to 18 m.p.h. The new machine is said to have many uses in the railway field, such as operating four tie-tamping tools, sand blasting in bridge and building work and operating rock drills, paving breakers, backfill tampers and many other air tools.

Accessories for the Model 60 include a bulldozer attachment for backfilling trenches or for other light grading, and a power take-off for operating many types of belt-driven equipment. Weighing 2,600 lb., the unit is equipped with a lifting eye for easy handling by cranes.



The New Schramm Model 60 Crawler Compressor

## Air-Lubricated Pneumatic Hammer

A NEW line of air-lubricated, air-cooled pneumatic hammers is being placed on the market by the Dow Pneumatic Tool Company, Chicago. A feature of the new tool is that each of them has a loose or sloppy fitting piston and is said to require only a few drops of oil each month or so to prevent possible internal corrosion. Each of these tools is said to have only two inexpensive parts which will require replacement in a lifetime of use, and either part, it is claimed, can be replaced by anyone in less than two minutes.

Two models are now being produced—a light general-purpose hammer for riveting, scaling, scraping or cutting, and a medium-weight hammer for breaking plaster, chipping, peining and special work requiring a hammer of this weight. In addition, production tests are now being conducted with working models of a number of specialized tools which will be ready for production in a short time. All the Dow hammers have a built-in safety tool holder which prevents the tool set from shooting out if the air power is turned on accidentally when the tool is not on the work. Also, all models are so constructed that the tool sets are interchangeable from one type hammer to another.

One of the Dow Air-Lubricated Air-Cooled Pneumatic Hammers

## Tractor Excavator

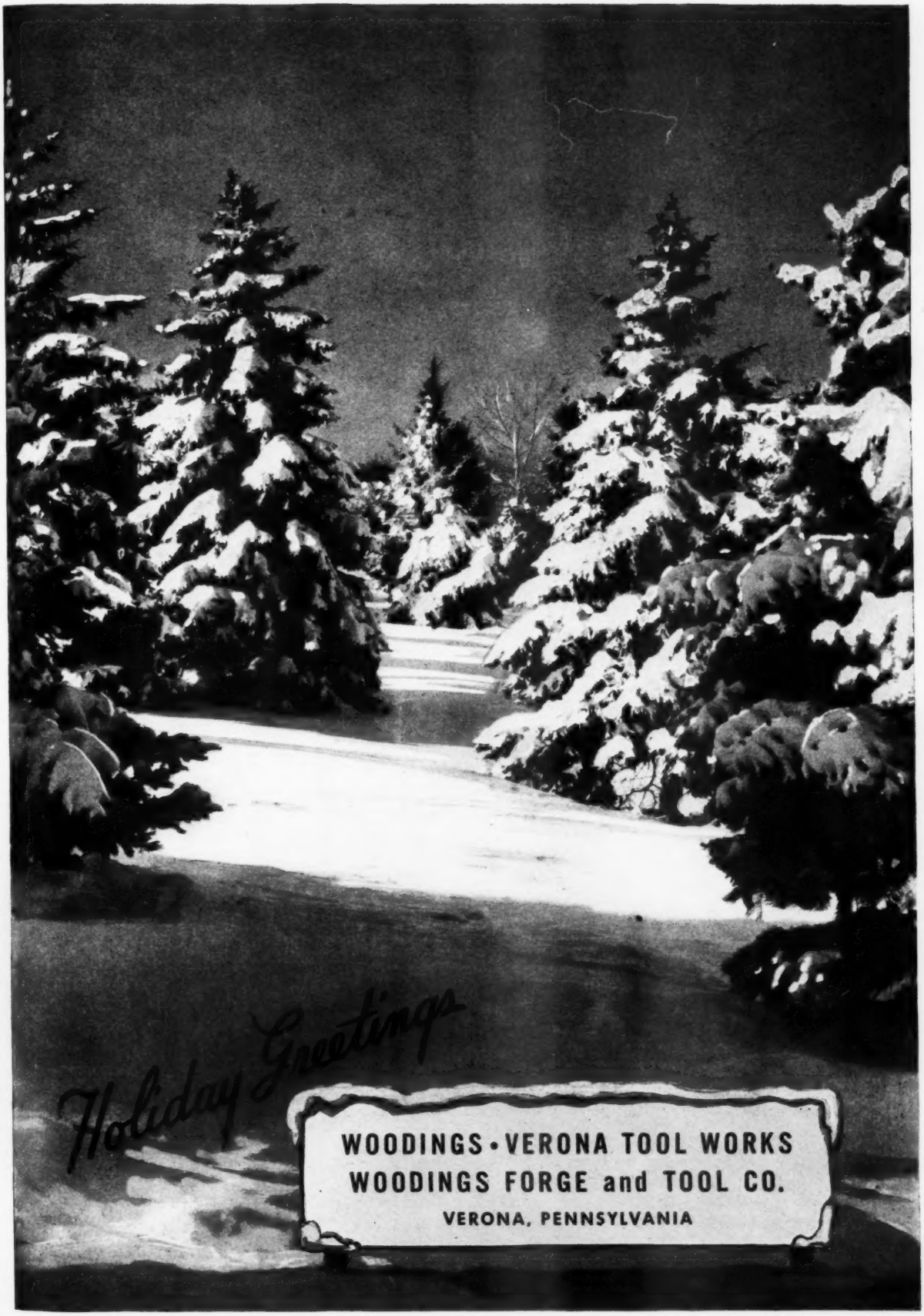
A HYSTAWAY attachment for use with the Caterpillar D8 track-type tractor has been announced by the Hyster Company, Portland, Ore.

A Caterpillar D8 Tractor Fitted with a Hystaway Operating as a Dragline

Combining a dragline, clamshell and crane, this model is similar in design to those intended for use with the Caterpillar D6 and D7 tractors, which

(*Continued on page* 1238)

*(For additional information on any of the products described on this page, use postcards, page 1201)*


Holiday Greetings
WOODINGS • VERONA TOOL WORKS
WOODINGS FORGE and TOOL CO.
VERONA, PENNSYLVANIA

(*Continued from page* 1236)

were described in *Railway Engineering and Maintenance* for July, 1947.

Specifications for the Hystaways now call for ½-cu. yd. buckets on the D7 and D8 and a ⅜-cu. yd. bucket on the D6. The basic Hystaway unit is now made for any of the three models, with an attachment group for each model. Attachment groups are also made for fitting the Hystaway unit to wide-gage tractors and to those with additional attachments. Counterweight boxes are available for use where the units are fitted on tractors without bulldozers.

## Liquid Wax for Snow-Plow Blades

A NEW liquid wax prepared especially for application to snow plow blades and which, it is reported, makes snow removal faster and easier, has been announced by the Pennsylvania Refining Company, Cleveland, Ohio. To be marketed as Penn Drake Snow Plow Wax, the material is applied to the mold board, blades and wings of the plows and hardens into a slick surface over which wet snow slides easily. Because the accumulation of snow is thus minimized, the use of the wax is said to help to eliminate delays for clearing plows and also helps to prevent breakdowns from overloading of the plows.

The wax is applied with an ordinary paint brush and hardens within a few minutes. It is recommended that the application be made when the temperature is above freezing and that the surface be dry. The protective coating of wax is also said to aid in the prevention of rust. One gallon of the wax covers approximately 300 sq. ft. of plow surface. It is available in 1-gal., 2-gal., 5-gal., 15-gal., 30-gal., and 55-gal. quantities.

**Applying the Penn Drake Snow Plow Wax to a Snow Plow Blade With A Paint Brush**

## Carrying Case For Welding Outfits

THE Air Reduction Sales Company, New York, is now offering an improved carrying case for transporting welding or cutting outfits to and from the job. The case is fabricated from 22-gage, cold-rolled steel and has flush double-lock seams and reinforced ends and cover, the latter being panelled for rigidity and strength.

**The Airco Apparatus Carrying Case with the Lift-Off Tray Exposed**

The case has a net weight of 10½ lb. and is 22 in. long, 8 in. wide and 9 in. deep, being sufficiently large to accommodate torches, tips, regulators, hose, gloves, goggles, wrenches and other items. A feature of the case is a handle-equipped, compartmented lift-off tray for small items. Heavy-duty bolt catches and a padlock hasp are provided.

# New Book

## Science of Color

COLORS—What They Can Do for You, by Louis Cheskin, 330 pages, 5½ in. by 8½ in. Bound in cloth. Illustrated. Published by the Liveright Publishing Corporation, 386 Fourth avenue, New York. Price $5.

TAKING the psychological aspect of color as the theme for this book, the author draws heavily from his knowledge of the use of color in psychology, art and design which he has gained from his experience as an artist, as a specialist in advertising and package design, and as associate director of the Color Research Institute of America. Acknowledging in a foreword his indebtedness to the director of that organization, George D. Gaw, for his advice and assistance in preparing the material for the book, Mr. Cheskin adds much authority to his words.

By dealing with the effect of color on man's emotional life the author is able to dismiss almost casually the technical aspect of color as the physicist sees it, and to write entertainingly on color as seen and used by the chemist, the artist, the physiologist, and psychologist. The average engineer, whose education in color has been seldom more than an acquaintance with the prismatic spectrum, will appreciate the opportunity here afforded for him to broaden his knowledge of this effective medium of expression. He will begin to think not in terms of the three primaries of Newton's seven-color spectrum, but of the physiologist's four primary colors in groups of two—red-green and blue-yellow.

The railway engineer will become accustomed, possibly for the first time, to the "afterimage" of these primaries and will realize how this effect should control his use of color in the design of all types of railway buildings.

In organizing the book the author has made the contents section a definite contribution to the text. The seven main chapters, which average about 40 pages each, are subdivided into from 6 to 19 sub-sections. In the contents, a brief synopsis of each of these sections gives at a glance the gist of the subject, or a significant statement from it. This enhances the value of the book for reference—a necessity in a work of this character, so filled with allied but divergent information that memorization of the facts can not be depended upon.

An appendix defines terms and includes additional material on several subjects and describes in detail some of the more complex color charts included as illustrations.

*(For additional information on any of the products described on this page, use postcards, page 1201)*

# SCHRAMM

## No. 60 CRAWLER AIR COMPRESSOR

## EASY MOBILITY MULTIPLIES ITS USES

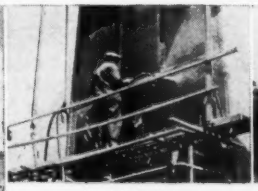
The Schramm No. 60 Crawler is an efficient compressor for serving four tie tampers, but that is not all. Because it goes anywhere—on or off the track under its own power—it is right for many other railroad jobs as well, even ones in the most inaccessible places. Its crawler treads, driven by a powerful motor, give it maximum maneuverability and convenience.

Get full details about this new air producer which makes such a hit with all who see it. Bulletin FC-48 is waiting for you. Get your copy from the Railway Sales Department, Schramm, Inc., "The Compressor People," West Chester, Pennsylvania.

*Tie tamping*

*Trench digging*

*Concrete breaking*

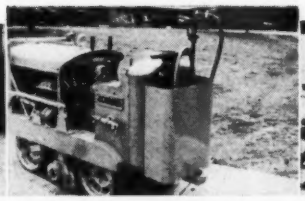


*Sand blasting*

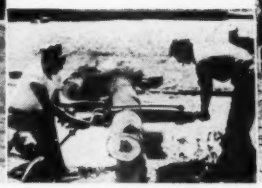
*Weed burning*

*Rock drilling*

*Spray Painting*



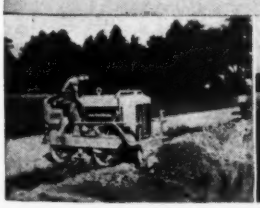
*Crawler with tool rack*

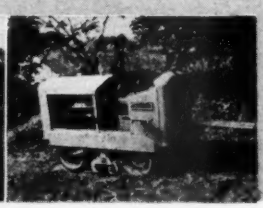


*Sawing*

*Backfill tamping*

### *Plus these Extra Bonus Uses!*





**Question:** What to do with a compressor when you don't need it for air tools? The answer is easy if you have a Schramm No. 60 Crawler. To the left you see it (with proper attachments) performing three non-compressor jobs—backfilling, weed mowing, and supplying power for sump pumps, saws, etc. It is the compressor with *plus* utility.

# Changes in Railway Personnel

## General

**D. M. Trotter**, division engineer on the St. Lawrence division of the Canadian National, with headquarters at Montreal, Que., has been promoted to assistant superintendent with the same headquarters.

**M. L. Counter,** roadmaster on the Chicago, Burlington & Quincy, with headquarters at Lincoln, Neb., has been promoted to trainmaster on the Lincoln division, at the same place, succeeding **J. M. Turner,** who has been promoted to assistant superintendent, with headquarters at Sheridan, Wyo.

**Howard W. McCauley,** division superintendent on the Northern Pacific, with headquarters at Glendive, Mont., and formerly a roadmaster on this road, has been appointed chief of personnel. Mr. McCauley was born at St. Paul, Minn., on June 29, 1897, and attended St. Thomas college and the University of Minnesota. He entered railroad service with the N. P. in 1913, as a clerk in the office of car accountant at St. Paul, serving at that point during summer vacation periods until 1916. He then joined the U. S. Corps of Engineers as a rodman, and in December, 1917, became a timekeeper in the engineering department of the Chicago, St. Paul, Minneapolis & Omaha. Mr. McCauley next joined the Great Northern, holding positions successively as a clerk in the engineering department at Superior, Wis., and accountant in the valuation department at St. Paul. Following his association with the N. P. in 1923, he served in various capacities, including that of roadman in the engineering department, bridge inspector, roadmaster, division roadmaster, trainmaster-roadmaster and trainmaster. He became superintendent of ore operations at Superior in April, 1942, and in November of that year was appointed division superintendent at Glendive, Mont., which position he held at the time of his new appointment.

## Engineering

**Maro Johnson,** principal assistant engineer of the Illinois Central, with headquarters at Chicago, has retired.

**John M. Bates** has been appointed fire and sanitation engineer of the Union Pacific, at Omaha, Neb., succeeding **Edward M. Strauss,** who has retired.

**Harry G. Lennox,** assistant engineer in the office of the auditor of capital expenditures of the Chicago & North Western, at Chicago, has retired after 42 years of service with this company.

**K. E. Hornung,** chief draftsman in the office of the engineer and superintendent of bridges and buildings on the Chicago, Milwaukee, St. Paul & Pacific at Chicago, has been promoted to architect, to replace **A. O. Lagerstrom,** who has been advanced to the newly-created position of assistant superintendent of buildings, with the same headquarters.

**V. V. Holmberg,** supervisor of bridges and buildings on the Chicago & Western Indiana, with headquarters at Chicago, has been appointed to the newly-created position of assistant engineer with the same headquarters.

**G. L. Field,** division engineer of the Capreol division of the Canadian National at Capreol, Ont., has been transferred to the St. Lawrence division with headquarters at Montreal, Que., succeeding **D. M. Trotter,** whose promotion to assistant superintendent is noted elsewhere in these columns.

**A. V. Johnston,** senior assistant engineer, Central region, Canadian National, Toronto, Ont., has been appointed office engineer with the same headquarters. Mr. Johnston was born at St. Thomas, Ont., on July 31, 1909, and was graduated by Queens University, Kingston, Ont., in 1935 with the degree Bachelor of Science Electrical Engineering. He entered railroad service in 1927 on the Canadian National, serving in various positions in the bridge and building department until August, 1936, when he became bridge and building master on the St. Thomas and Stratford divisions. In 1941 he was appointed assistant division engineer of the Belleville division. Subsequently, in 1942, he was advanced to division engineer, with headquarters at Hornepayne, Ont., and Belleville, in which capacity he served until 1946 when he became senior assistant engineer of the Central region at Toronto, the position he held at the time of his recent promotion.

**William E. Griffiths,** general maintenance inspector of the Montreal terminals of the Canadian National, has been appointed engineer of track at Montreal, Que., succeeding **John A. Ellis,** who is retiring after 44 years' association with railway engineering in England, India and Canada. Mr. Ellis was born in Scotland in 1882 and studied engineering at the City and Guilds Technical College, London, England. Following service on underground construction in London with the Great Northern he spent five years on construction and maintenance with the Oudh & Rohilkund State Railway in India. He went to Canada in 1911 and joined the Canadiana Northern (now C. N. R.), later entering the service of the Canadian Government railway (now also C. N. R.) at Moncton, N.B., as office engineer. In 1921 Mr. Ellis was appointed assistant engineer of roadway standards, Canadian National, at Toronto, transferring to Montreal in 1923. He was appointed engineer of track at Montreal in 1942.

**James K. Gloster,** assistant division engineer of the Louisville & Nashville, with headquarters at Louisville, Ky., has been appointed to assistant engineer, chief engineer's office, at Louisville. He succeeds **Robert Samuell,** who has resigned. Mr. Gloster is succeeded by **R. B. Lindsey,** resident engineer at Pascagoula, Miss., who in turn is succeeded by **Claude Johnston. Alex Manson,** assistant engineer on the Louisville and Birmingham divisions, has been appointed assistant engineer in the miscellaneous department of the chief engineer's office. **A. E. Hotard,** draftsman in the chief engineer's office, has been advanced to assistant engineer of the Birmingham division.

**Harry T. Welty,** engineer of structures of the New York Central, with headquarters at New York, has retired after forty-three years of service with this company. He was born at Marion, Ohio, and in 1897 received a Bachelor of Science degree from the Maryland Agricultural College (now the University of Maryland); in 1902 a Bachelor of Science degree from the Case School of Applied Science (now the Case Institute of Technology); and a degree in civil engineering in 1905 from the latter school. He entered railroad service on October 1, 1904, as bridge designer for the New York Central, serving in this capacity and as assistant engineer in the bridge department until 1910, when he was made engineer of bridges in the maintenance of way department. In August, 1911, he was appointed engineer of bridges—West Side Improvements—which position he held until September, 1913, when he became engineer of structures, the position he held at the time of his retirement.

**B. J. Worly,** assistant division engineer of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Butte, Mont., has been promoted to division engineer at Aberdeen, S.D. Mr. Worley succeed **K. L. Clark,** who has been transferred to Chicago, succeeding **T. H. Strate,** who has retired.

Mr. Strate was born at Moorhead, Minn., and received a degree of Bachelor of Science in Civil Engineering from the University of Minnesota. He entered railway service in June, 1901, as levelman for the C.M.St.P.&P., on the Reno-Preston branch of the Dubuque division. He became a draftsman in 1902 and resident engineer in 1903. Subsequently he served in various capacities as assistant engineer, 1903-06; locating engineer, 1905; assistant engineer, 1905-06; assistant division engineer, 1906-07; division engineer, 1907-08; construction trainmaster, 1908; assistant engineer, 1908-10; locating engineer, 1910; assistant engineer, 1910-12; locating engineer, 1912; construction engineer, 1912-15; field engineer on federal valuation, 1915-18; valuation engineer, 1918-

(*Continued on page* 1244)

ILLUSTRATION THROUGH COURTESY OF L. & N. R. R.

**Only the RAILROADS pay their own way. All other forms of transportation receive subsidy advantages paid for out of taxpayers money.**

**IN A YEAR THE RAILROADS HAVE SPENT:**

**More than $1,500,000,000 for materials**
**More than $5,000,000,000 for wages**
**More than $1,800,000,000 for taxes**

**Positive action must be taken to assure the RAILROADS a fair revenue so that they, in turn, can render their essential service to the nation.**

*Standard and Special Track Work for Steam Railroads Since 1882*

# WEIR KILBY CORPORATION

**CINCINNATI 12, OHIO** — **BIRMINGHAM 7, ALA.**

*Successors to*

**WEIR FROG CO. . . . KILBY FROG & SWITCH CO. . . . CINCINNATI FROG & SWITCH CO.**

Merry
Happy
THE RAIL JOIN

Christmas
and a
New Year
OMPANY, INC.
NEW YORK

(*Continued from page* 1240)

20; and engineer of track elevation, 1920-33. In February, 1933, he was appointed division engineer, Chicago Terminal division, the position he held at the time of his retirement.

## Track

**J. O. Cobb** has been appointed assistant supervisor of track, Maumee district, on the Chesapeake & Ohio, with headquarters at Walbridge, Ohio.

**C. P. Battel,** roadmaster on the Canadian National with headquarters at St. Catharines, Ont., has retired after 38 years of service with this company.

**H. W. Poteet** has been appointed track supervisor on the Atchison, Topeka & Santa Fe, with headquarters at Lakin, Kan., succeeding **E. V. Winfrey,** who has been transferred to Littleton, Colo.

**J. G. Wilson,** signal apprentice on the Long Island, has been promoted to assistant supervisor of track on the New York division of the Pennsylvania, at Jamesburg, N.J., to succeed **W. G. Wells,** resigned.

**O. G. O'Bryant** has been appointed roadmaster on the Memphis division of the Missouri Pacific at Marianna, Ark., to replace **B. R. Cason,** who has been transferred to the Illinois division, with headquarters at Chester, Ill., to replace **J. M. Lunsford,** who has been assigned to other duties.

**J. A. Wilkinson**, whose promotion to roadmaster of the Iowa division of the Chicago & North Western, with headquarters at Ames, Iowa, was announced in the August issue, has now been appointed roadmaster at Proviso, Ill., replacing **L. T. Day,** whose death on October 25 was mentioned in these columns last month.

**W. V. Parker,** roadmaster on the Chicago, Burlington & Quincy at Central City, Neb., has been transferred to Ferry, Neb., replacing **George Green** who has been transfered to Lincoln, Neb., to succeed **M. L. Counter,** whose promotion to trainmaster is noted elsewhere in these columns. **H. George,** track supervisor at Central City, has been appointed acting roadmaster at that point to replace Mr. Parker.

**J. T. Phillips,** general roadmaster on the Norfolk Southern, with headquarters at Norfolk, Va., has retired after 53 years of railroad service.

Mr. Phillips was born on September 9, 1875, in Lenoir county, North Carolina, and entered railroad service with the Atlantic Coast Line in 1894. His service with the Norfolk Southern began in 1906 in the construction department. In 1908 he was promoted to bridge foreman and in 1913 he was advanced to track supervisor. Three years later Mr. Phillips was further promoted to general foreman of bridges and buildings. In 1923 he was appointed roadmaster, and in January, 1946, he assumed the position of general roadmaster for the system, and held this position until the time of his recent retirement.

**H. W. Seeley,** supervisor of track on the Pennsylvania, at Columbus, Ohio, has been transfered to the Maryland division, with headquarters at Wilmington, Del., to succeed **L. L. Harding, Jr.,** resigned. **A. E. Himler**, supervisor of track on the Eastern division, at Wellsville, Ohio, has been transferred to Columbus, succeeding Mr. Seeley, and **M. E. Walker,** assistant supervisor of track at Lancaster, Pa., has been promoted to supervisor of track at Wellsville, to succeed Mr. Himler. **J. P. McIntyre** assistant supervisor of track at Enola, Pa., has been transferred to Lancaster, to succeed Mr. Walker, and **W. E. Hiltebeitel,** junior engineer on the Chicago Terminal division, has been promoted to assistant supervisor of track on the Philadelphia division, with headquarters at Enola, succeeding Mr. McIntyre.

## Bridge and Building

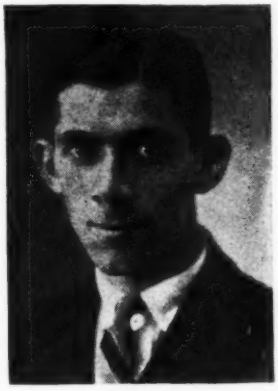
**John Ebbens,** general bridge and building foreman on the Chicago & Western Indiana, has been promoted to supervisor of bridges and buildings, with headquarters as before at Chicago, to succeed **V. V. Holmberg,** whose appointment as assistant engineer is noted elsewhere in these columns.

## Special

**Joseph B. Gunnison** has been appointed architect of the New York Central system at New York, succeeding **J. P. Gallagher,** who has been appointed general superintendent of insurance and fire protection. **H. C. Todd, Jr.,** has been appointed assistant architect.

**W. H. Harrison,** whose appointment as assistant engineer of work equipment on the Chesapeake & Ohio, with headquarters at Richmond, Va., was reported in the October issue, was born at Richmond, Va., in 1905, and began his railroad career with the Chesapeake & Ohio in 1922, as a rodman at Newport News, Va. He was promoted to material accountant in 1924, to masonry inspector in 1934, and to instrumentman in 1941. In 1944 he was advanced to assistant cost engineer, with headquarters at Richmond, Va., the position he held at the time of his recent appointment.

**N. W. Hutchison,** whose appointment as engineer of work equipment on the Chesapeake & Ohio, with headquarters at Barboursville, W. Va., was reported in the October issue, was born at Pittsburgh, Pa., in 1903, and received his higher education at Muskingum College and Ohio State University. He entered railroad



N. W. Hutchinson

service on February 1, 1927, as a timekeeper with the Hocking Valley (controlled by the Chesapeake & Ohio). In January, 1928, he was appointed assistant cost engineer of the C. & O., with headquarters at Columbus, Ohio, whence in 1930 he was transferred to the office of the cost engineer, at Richmond, Va. In 1943 Mr. Hutchison was assigned to special duties under the engineer maintenance of way and chief engineer, and was serving in that capacity at the time of his recent appointment as engineer of work equipment.

## Obituary

**Raleigh E. Dailey** who retired on February 1, 1938, as supervisor of bridges and buildings on the Radford division of the Norfolk & Western, died on October 14 at Mullens, W. Va. A native of Tazewell County, Va., where he was born on January 13, 1868, Mr. Dailey started to work for the Norfolk & Western on September 25, 1901, as a carpenter on the Pocahontas division. He was promoted to carpenter foreman on October 28, 1904, and to chief tie inspector on July 1, 1922. He was promoted to supervisor bridges and buildings in 1923.

## Trade Publication

*(To obtain copies of this publication, use postcards, page* 1201.)

**Caterpillar Bulldozers**—The Caterpillar Tractor Company has recently published a 16-page booklet, printed in two colors, entitled "Dozing the Way," which describes the capabilities and performance of this Company's cable-operated bulldozers. Highly illustrated, the book depicts a number of projects of various types showing this type of Caterpillar equipment at work.

(*Please turn to page* 1246)

# PULL and DRIVE Spikes the Nordberg Way

***Pulling Spikes***

Quick removal of spikes by these two Nordberg Spike Pullers speeds up rail laying. Each machine will pull from 35 to 45 spikes per minute.

***Driving Spikes***

Close behind the rail laying gang, two Nordberg Spike Hammers working in tandem drive about 1600 spikes an hour.

***Nordberg Power Tools For Your Track Maintenance***

**Spike Puller**
**Spike Hammer**
**Adzing Machine**
**Track Wrench**
**Rail Drill**
**Cribex**
**Power Jack**
**Surface Grinder**
**Utility Grinder**
**Flexible Arm Grinder**
**Midget Grinder**
**Track Shifter**

Getting out spikes from the old rail and re-spiking the new rail are two operations that when mechanized are done at a big saving in time, manpower and expense. With power tools developed by Nordberg, these no longer are hand operations. One of the more recent tools brought out by Nordberg for rail maintenance is the Spike Hammer, a machine which drives spikes faster and easier, all driven straight, to the correct depth, and with no possibility of damage to rail by a misdirected blow. Driving spikes the Nordberg way is now the easiest job in rail laying and permits the spiking to be completed as rapidly as the new rail can be laid. If your spike pulling and driving operations are not fully mechanized, investigate the advantages of Nordberg spike tools.

**NORDBERG MFG. CO. MILWAUKEE 7, WIS.**

# NORDBERG POWER TOOLS

*for better maintained track at less expense*

# 2 SPECIAL LUBRICANTS for Railroad Maintenance

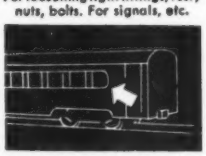
**Now being used by many railroads for a wide range of applications on rolling stock and maintenance of way, these special lubricants are recommended for efficiency, economy, and ease of application. Clean—fast working—long lasting!**

## AMERICAN DRIPLESS OIL

"Runs in—Will not run out." Enters as a rapid penetrant, converts to a dripless, long wearing film, containing a chemical inhibitor for maximum rust-proofing. Will not drip or run at 200 degrees F. Will not gum or harden at 20 degrees below zero F. For hand brake mechanisms . . . wire rope cables of cranes and other lifting devices . . . release mechanism of gondola cars . . . car door tracks and locks . . . hinged sections of Diesel locomotives . . . etc.

For windshield wipers; cabin door, other hinges.

For loosening tight fittings, rusty nuts, bolts. For signals, etc.


For window mechanisms, door locks and checks.

## DOOR-EASE STICK LUBRICANT

Use like a crayon for clean lubrication of exposed surfaces—to stop squeaks and binding and prevent wear on door dovetails and strikers . . . berth chains . . . rubber bumpers, etc.

Mail Coupon for Free Samples and full details.

**AMERICAN GREASE STICK CO.**
**MUSKEGON, MICHIGAN**

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American Grease Stick Company,
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**Send Free Samples and full details.**

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# Association News

## Roadmasters' Association

There will be a meeting of the Executive committee in Chicago on December 5, at the Chicago Engineers' Club, beginning at 9:30 a.m. This meeting will be concerned primarily with the selection of the personnel of technical committees to make studies for reports to be presented at the next annual convention.

## Bridge & Building Association

At a meeting of the Executive committee, held in Chicago on November 20, the personnel of all technical committees, including chairmen and vice-chairmen, was set up for the current year. Particularly gratifying to those present was the unusually large number of volunteers for committee work, and the report of the treasurer, which indicated the finances of the association in better condition than at any time since the beginning of the war.

## Metropolitan Maintenance of Way Club

At the next meeting of the club, which will be a luncheon meeting in the Lounge of the Hotel Sheraton, New York, on December 11, the principal speaker will be E. M. Hastings, chief engineer, Richmond, Fredericksburg & Potomac, who will talk on "An Engineer Looks at the State of the Nation." In accordance with a practice of long standing this meeting is scheduled to be held on the same day as the annual dinner of the New York Railroad Club.

## Wood Preservers' Association

Plans are rapidly taking shape for the annual convention of the association to be held at St. Paul, Minn., April 27-29, 1948. Members and guests will be housed at the Hotel St. Paul and nearby Hotel Lowry, and assurances have been received of ample accommodations.

In addition to a full quantity of committee reports, the program is assured of many interesting contributed papers. In fact, it is reported that such a large quantity of such material has been suggested as to present a major problem in its selection.

## American Railway Engineering Association

The secretary of the association has announced that its members, voting by letter ballot, have approved by a large majority revisions in drilling standards for 115-lb., 132-lb., and 133-lb. R.E. rail (and the punching of corresponding joint bars), as now published in the manual. Subsequent to member approval, the changes have been approved by the Association of American Railroads.

It has also been announced that, in another letter ballot, proposed increases in dues were approved by the members by a vote of 814 to 154. To approve these increases an affirmative vote of two-thirds, or only 645, of those voting was necessary.

At the annual meeting of the member roads of the Association of American Railroads on November 21, the budget request for the 1948 research activities of the Engineering division was approved. This request amounted to $290,640, an increase of $56,000 as compared with 1947.

At the time of going to press no standing committees of the A.R.E.A. had scheduled meetings for December. Five such meetings were held during November, including meetings of the Committee on Wood Bridges and Trestles, on November 12; the Committee on Track, November 13; the Committee on Rail, November 21; and the Committee on Cooperative Relations with Universities, November 20—all these meetings being held at Chicago. In addition the Committee on Records and Accounts held a meeting at Washington, D.C., on November 12 and 13.

The first bulletin containing committee reports for presentation at the 1948 convention was mailed to members of the association on November 25. This is Bulletin 469 (November). It contains the reports of the committees on Water Service and Sanitation, Buildings, Highways, Yards and Terminals, Economics of Railway Location and Operation, and Uniform General Contract Forms.

## Maintenance of Way Club of Chicago

The next meeting of the club will be held on December 15, one week earlier than usual to avoid the Christmas season. The meeting, which will be held at Hardings at the Fair, beginning with dinner at 6:30 p.m., will be addressed by G. M. Magee, research engineer, Association of American

## Meetings and Conventions

**American Railway Bridge and Building Association**—Annual meeting, September 21-23, 1948, Hotel Stevens, Chicago. Elise LaChance, secretary, 431 S. Dearborn street, Chicago 5.

**American Railway Engineering Association**—Annual Meeting, March 16-18, 1948, Chicago. W. S. Lacher, secretary, 59 E. Van Buren street, Chicago 5.

**American Wood-Preservers' Association**—Annual meeting, April 27-29, 1948, St. Paul, Minn. H. L. Dawson, secretary-treasurer, 1429 Eye street, N.W., Washington 5, D. C.

**Bridge and Building Supply Men's Association**—Joint exhibit with Track Supply Association, September 21-23, 1948, Hotel Stevens, Chicago, during concurrent conventions of American Railway Bridge and Building Association and Roadmasters' Association. E. C. Gunther, secretary, 122 S. Michigan avenue, Chicago 3.

**Maintenance of Way Club of Chicago**—Next meeting, December 15, 1947. C. R. Knowles, secretary-treasurer, 105 W. Adams street, Chicago 3.

**National Railway Appliances Association**—Thirty-third annual exhibit, Chicago, March 15-18, 1948, in connection with A.R.E.A. convention. C. H. White, secretary, 208 S. LaSalle street, Chicago 4.

**Roadmasters' and Maintenance of Way Association of America**—Annual meeting, September 21-23, 1948, Hotel Stevens, Chicago. Elise LaChance, secretary, 431 S. Dearborn street, Chicago 5.

**Track Supply Association**—Joint exhibit with Bridge and Building Supply Men's Association, September 21-23, 1948, Hotel Stevens, Chicago, during concurrent conventions of Roadmasters' Association and American Railway Bridge and Building Association. Lewis Thomas, secretary, 59 E. Van Buren street, Chicago 5.

Railroads, who will discuss latest observations and results of the many roadway and structures tests being conducted under the direction, or cooperation, of his staff.

The November 24 meeting, with an attendance of 123 members and guests, was addressed by W. T. Rice, superintendent of Potomac yard, Richmond, Fredericksburg & Potomac, at Alexandria, Va., who spoke on Modern Yard Maintenance.

## Supply Trade News

### General

The **Florida Land Clearing Equipment Company,** Jacksonville, Fla., has announced that the company's Fleco Root Rake and Fleco Detachable Stumper will be marketed exclusively throughout the world by the distributor organization of the **Caterpillar Tractor Company.**

**Sperry Products, Inc.,** operators of the **Sperry Rail Service** for testing rails in track, are planning to move their plant and general offices from Hoboken, N.J., to Danbury, Conn., during the summer of 1948. A 20-acre site has been acquired at the latter location, on which construction of a monitor-type manufacturing building and a three-story office building will be started immediately. Present branch offices of the company at Chicago and St. Louis, Mo., will be maintained.

**The Syntron Company,** Homer City, Pa., manufacturers of vibratory material-handling equipment and portable construction and maintenance tools, has announced the purchase of new manufacturing facilities at Blairsville, Pa., twelve miles from Homer City. The newly-acquired property will add approximately 100,000 sq. ft. of floor space, fully equipped for heavy manufacturing, to the company's present facilities. The manufacture of heavy-duty vibratory feeders and conveying equipment will be transferred to the new plant at Blairsville, thus releasing space at Homer City to permit expansion of the manufacture of electric tools, gasoline hammers, concerte vibrators, and other products. The general offices of the company will remain at Homer City.

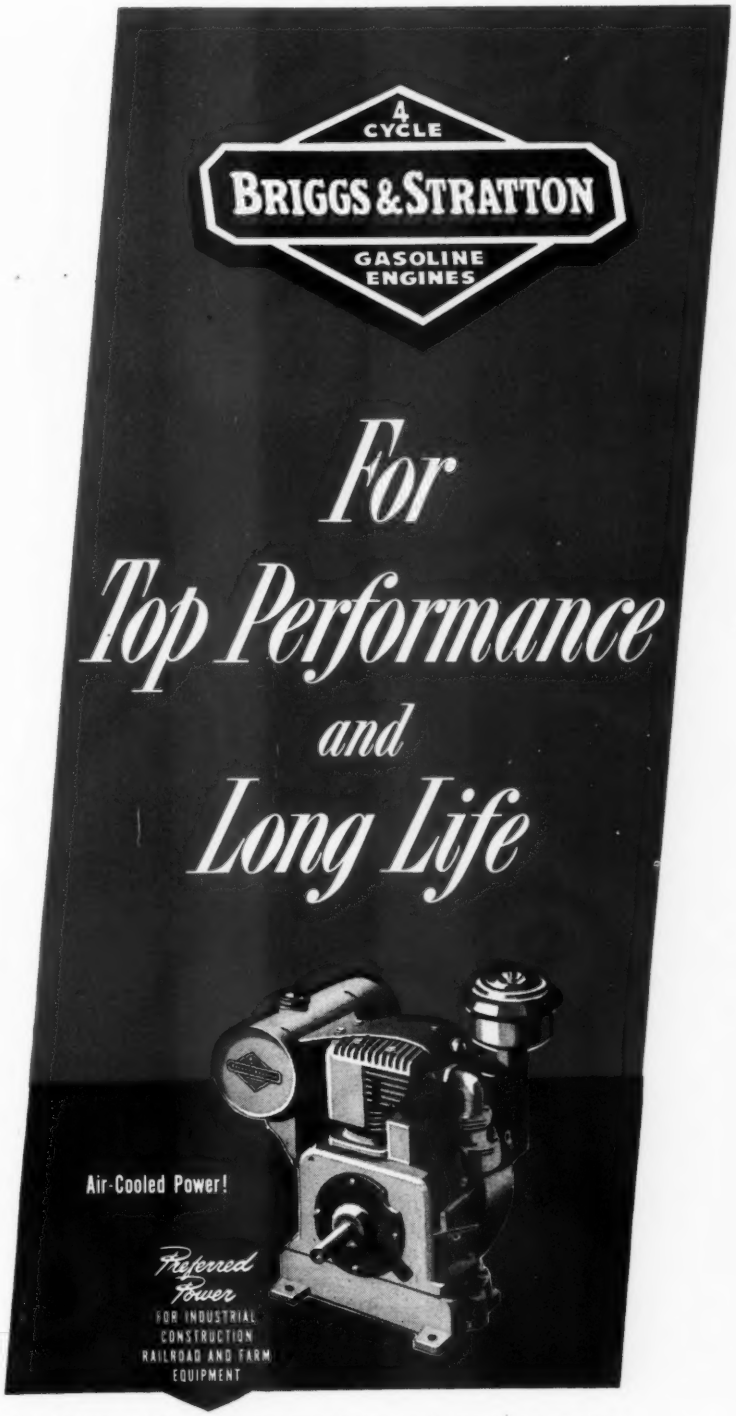
### Personal

**T. G. Gill,** wood technologist, has joined the laboratory staff of the **Timber Engineering Company.**

**Alvin W. Dawson** has been elected president of the **American Locker Company,** Boston, Mass., to succeed the late **Paul W. Kimball.**

The **Pioneer Engineering Works, Inc.,** Minneapolis, Minn., has announced the appointment of **Truman A. Dunn** as sales engineer for Kentucky, West Virginia, Ohio, Indiana, lower Michigan and northern Illinois, with headquarters at Bloomfield, Ind.

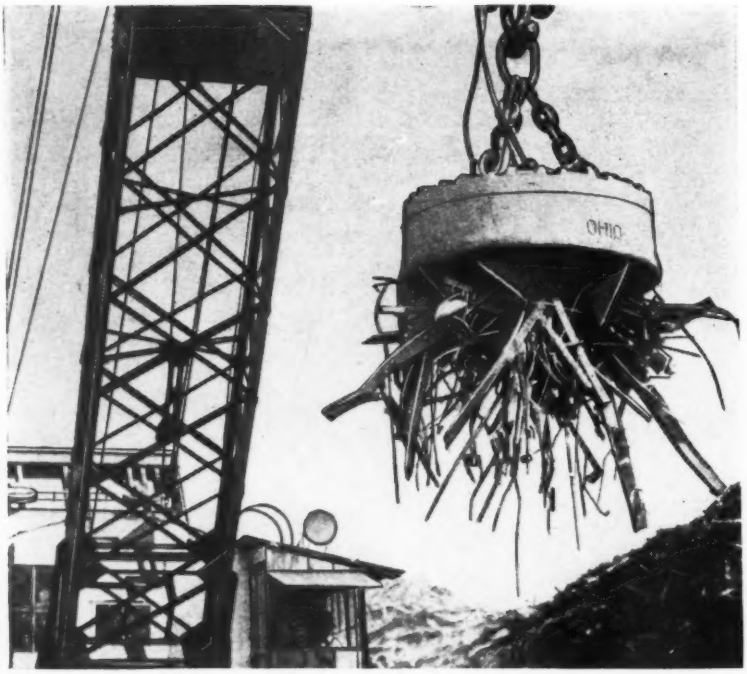
(*Continued on page* 1248)




The Briggs & Stratton trademark on each gasoline engine is assurance of *reliable power* for your equipment. This is proven by the 28-year performance record of more than 3¼ MILLION Briggs & Stratton engines. Only engines sound in design and ruggedly built could create the world-wide preference which Briggs & Stratton engines *have earned.*

Briggs & Stratton engines *have more experience built into them* than any other 4-cycle air-cooled engines.

**BRIGGS & STRATTON CORP., MILWAUKEE 1, WIS., U S.A.**

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Ohio MAGNETS

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**THE OHIO ELECTRIC MFG. CO.**

5916 MAURICE AVE. • CLEVELAND 4, OHIO

(*Continued from page* 1247)

**D. A. Hultgren,** of the **David A. Hultgren Company,** Chicago, has taken over railway sales in the midwest district for the **Marvel Equipment Company,** manufacturers of various types of switch heaters and other railway equipment.

**Lee S. Coulter** has been promoted to manager of the Industrial Sales Division of the **American Hoist & Derrick Co.,** Minneapolis, Minn., according to an announcement by **Stanely M. Hunter,** vice-president in charge of sales. Mr. Coulter

**Lee S. Coulter**

has served this company for 18 years. He will direct the sales and merchandising activities of his division through the company's world-wide sales organization.

**V. Dale Wissmiller** has been appointed western manager of the Railway Controls division of the **Minneapolis-Honeywell Regulator Company,** with headquarters at Chicago, and **Frank B. Conlon** has been appointed eastern manager of the division at New York.

The **Morrison Railway Supply Corporation** and its subsidiary, **Morrison Metalwald Processes, Inc.,** have announced the establishment of offices in the Empire building, Birmingham, Ala. **Marvin B. Morrison,** vice-president and southern division manager, will be in charge of the new office.

**The Permutit Company** has announced the appointment of **Austin F. McCormack** as sales engineer in charge of its newly-established Rochester, N.Y., office. This office replaces the one formerly located in Syracuse, N.Y., and directed by **F. D. West,** who has retired after 29 years' service.

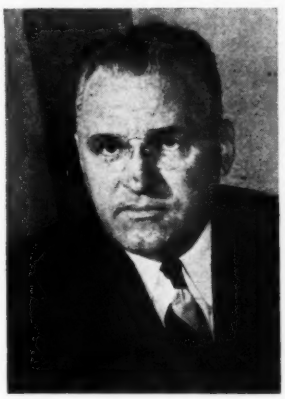
**J. C. Elmburg,** manager of the Boston, Mass., branch of **Fairbanks, Morse & Co.,** has been transferred to the Atlanta, Ga., branch in the same capacity, to replace **G. N. Van Epps,** resigned. **V. O. Harkness,** formerly manager of the Diesel division at Chicago, has been appointed manager of the Boston branch to succeed Mr. Elmburg, and **T. M. Robie** succeeds Mr. Harkness.

**Haig C. Dilsizian,** vice-president of **Templeton, Kenly & Co.,** has been appointed exclusive manager of export business for this company. Mr. Dilsizian's

organization, functioning as an independent unit, will continue to operate from the company's former offices in the Graybar building, New York. **E. A. Zimmerman** has been appointed Eastern District sales manager for domestic sales, with headquarters also in the Graybar building.

**Stewart J. Cort** has been appointed vice-president in charge of steel division operation of the **Bethlehem Steel Company,** to succeed **Quincy Bent** who retired on November 1. Mr. Bent will continue as vice-president in an advisory and consulting capacity and as a director of the corporation until December 31.

**Harold H. Reed**, assistant manager of the Metropolitan (New York) district of the **Air Reduction Sales Company,** has



**Harold H. Reed**

been appointed manager of this district. Mr. Reed successds **W. S. Schoenthaler,** who is retiring after thirty-seven years of continuous service with the company. **Oren M. Donohue,** formerly assistant sales manager has been appointed assistant manager, succeeding Mr. Reed. **William B. Brower,** who joined the company in 1922, now succeeds Mr. Donohue as assistant sales manager.

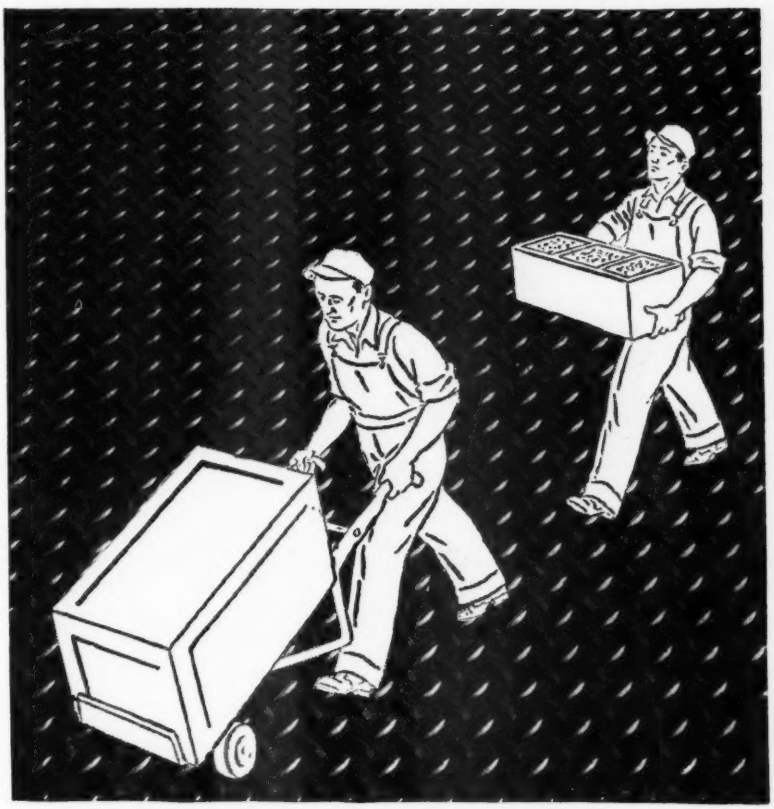
Mr. Reed was graduated from Hamilton College with a B. A. degree in 1919, and entered the service of the Air Reduction Sales Company in 1923 as a member of the gas sales department. In 1926 he was transferred to the Metropolitan District office as a sales correspondent. In 1928 he was promoted to assistant manager, which position he held until his recent promotion to manager of the Metropolitan District, which became effective on October 1.

Mr. Donohue joined the Air Reduction Sales Company in 1925 as a member of the credit department. In 1930 he was transferred to the Metropolitan District office as a sales correspondent, where he was promoted to assistant sales manager in 1944. He held the latter position until his recent promotion to assistant manager of the Metropolitan District.

The **Syntron Company,** Homer City, Pa., has announced the establishment of a branch sales office at 4695 Sherbrooke street, West, Montreal, Que., to be under the supervision of **C. F. A. Gray.** The purpose of the new office is to provide

(*Continued on page* 1250)


# SPEED Feet or Wheels...



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**Men and trucks start faster, move faster, and stop quicker on this super-tough safety steel flooring. The angular projections resist slipping and skidding, and provide positive traction even when wet. Use Inland 4-Way Floor Plate for floors, steps, platforms, ramps, or catwalks in your plant, or on mobile or stationary equipment you manufacture. Furnished in three size patterns and many thicknesses. Inland Steel Co., 38 S. Dearborn St., Chicago 3, Illinois. Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.**

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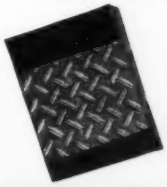

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# STOP DUSTING!

## Harden and protect your floors with STONHARD STONTOP

In roundhouses, shops, or wherever abrasion, oil and grease act to disintegrate concrete . . . use STONHARD STONTOP. It's easy to apply—you simply flush STONTOP over the old floor. STONTOP ends dusting and case-hardens your floor for greater durability.

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*For more information and a free railroad floor maintenance guide, return the coupon.*

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**Building Maintenance Materials**

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(*Continued from page* 1249

better sales and engineering service for the company's products in Quebec and the Maritime Provinces, relieving the company's office at Toronto, Ont., of the burden of providing this service.

**G. Edward Conn, Jr.,** a salesman in the district office of the **Allis-Chalmers Manufacturing Company** at Philadelphia, Pa., has been appointed manager of a branch office that the company has recently established at York, Pa. **MacGregor G. Jones,** resident representative of the company's branch office at Harrisburg, Pa., which has been discontinued, will act as sales representative at York to assist Mr. Conn.

### Obituary

**Henry Billing,** vice-president in charge of railway sales of the Collins Oil & Manufacturing Co., for the last nine years, died at his home in Elizabeth, N.J., on October 15. He was 56 years old. Before joining the Collins Company, Mr. Billing worked in the car department of the New York Central at Albany, N.Y., for 17 years.

**Frederick H. Thompson,** vice-president of the Simmons-Boardman Publishing Corporation, publishers of Railway Engineering and Maintenance and other rail-

**Frederick H. Thompson**

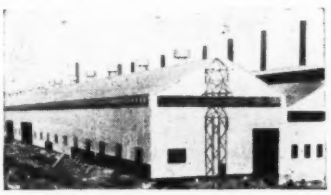
way and business periodicals, died at his home at Cleveland, Ohio, on November 13. Mr. Thompson was born on August 1, 1885, at Cleveland. After attending Brooks school at that point he studied at University school and Military Institute at East Orange, N.J. He started his business career in 1904 as eastern representative of the Music Trade Review, becoming advertising manager of the American Engineer and Railroad Journal in 1907. In 1912 he entered the service of the Simmons-Boardman Publishing Corporation as business manager of the Railway Mechanical Engineer. In 1920 he was advanced to general manager in charge of sales for all the railway papers of the company in the Central district, with headquarters at Cleveland. In 1924 he was elected a vice-president and director of the company which positions he held until his death.

(*Please turn to page* 1252)


# TIME PROVES

**Galvanized (ZINC-COATED) Sheets Stay Stronger Longer**

34 YEARS . . . Erected in 1913, and covered with heavy-gauge galvanized sheets, this Tennessee concentrating plant of the A/Z Company, is still in excellent condition after *more than 3 decades of service.* Painted with Gray Metallic Zinc Paint in 1932.



In building for the future, look to the past for proof of a building material's strength . . . durability . . . service. With galvanized (zinc-coated) roofing and siding, you get the strength of steel . . . the rust protection of Zinc. So for low-cost, long-time service, choose the building material that's proved by TIME itself . . . galvanized sheets. Send coupon for information about Zinc and how it can help keep your buildings and equipment stronger longer.

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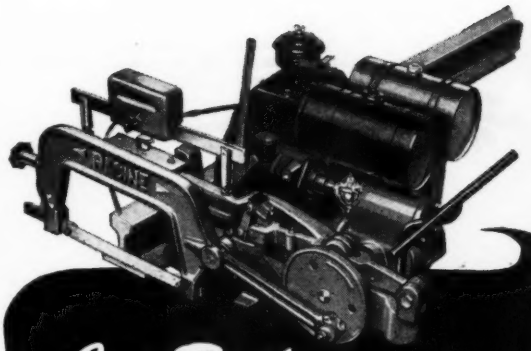

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**RIGHT ON THE TRACK**
*with . . .*

## RACINE PORTABLE Rail Saws

Your track maintenance and repairs can be speeded up with Racine Portable Rail Cutting Machines. This equipment cuts rail ends right on the track. No extra handling or hauling of the rail to central cropping plant.

Only one man needed to operate the Racine Rail Saw. Two men can easily carry it from rail to rail. These fast, accurate machines produce smooth, clean cuts without the overheating of rail ends that so often starts fractures leading to rail failure. Model 15 for rails to 7⅜" high; Model 16 for rails to 10" high.

### SIX COMMON JOBS FOR THIS MACHINE

1. Cutting and fitting rails at interlocking plants, crossings and switches.
2. Closing track in rail-laying operations.
3. Smooth, accurately cut rail for insulated joints.
4. Proper staggering of joints in curves.
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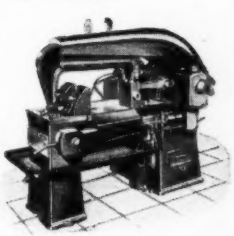

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are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

These washers are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

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**NEW ONAN CK ELECTRIC PLANTS** are available in 5,000 Watts D.C., 115 and 230 volts; 2000 and 3000 Watts A.C. in all standard voltages.

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**ONAN AIR-COOLED ENGINES**—CK: 2-cylinder opposed, 10 HP. BH: 2-cylinder opposed, 5.5 HP. IB: 1-cylinder, 3.25 HP.

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## Trade Publications

*(To obtain copies of any of the publications mentioned in these columns, use postcards, page 1201)*

**Going Places on Rubber**—This is the title of an eight-page illustrated pamphlet, printed in color, which has been issued by the Caterpillar Tractor Company to describe the operation of its rubber-tired grading equipment on a range of jobs where high speeds are required on long hauls. The booklet presents the equipment best suited to handle the situations encountered on projects of this type involving rock work, leveling and filling.

**Wall Breathing**—This is the title of a 20-page booklet, published by the Western Waterproofing Company, St. Louis, Mo., which discusses the causes and effects of masonry wall disintegration and deterioration. Pointing out that most of the trouble experienced with masonry is due to the penetration of water, effected through both mechanical and chemical means, the booklet discusses methods which may be employed to waterproof the masonry surfaces to stop permanently the ingress of water, and describes the use of this company's products, Resto-Crete and Dilato expanding mortar in masonry restoration.

**Aftercoolers for Air and Gas Lines**—Ingersoll-Rand Company has published a 16-page, two-color bulletin describing the benefits, principles and application of aftercooling for stationary air compressors or gas compressor installations. Several pages illustrate the various types of Ingersoll-Rand aftercoolers with cross-sectional views and descriptions of their operation. One spread is devoted to a typical compressor plant set-up, showing a complete layout, including compressors, intake filter, piping, aftercooler, receivers, headers and control panel. A selection table for choosing the proper size of aftercooler for a specific compressor output is also included in the bulletin.

**Simplex Jacks**—Templeton, Kenly & Company has recently issued a revised descriptive bulletin on its line of Simplex lever, screw and hydraulic jacks. Featured on the front page of the bulletin is a description of the Simplex industrial hydraulic jacks, which range in capacity from 3 tons to 100 tons, while the center spread describes in detail the Simplex lever jacks, including track jacks. Also described are jacks for special purposes such as for handling cable reels and drums, push-and-pull jacks, trench braces and timber braces.

**Building Maintenance Problems**—A folder recently published by the Stonhard Company deals with 15 urgent building maintenance problems. Included are recommended uses of Stonhard materials in repairing leaky roofs, worn flashings and gutters, rough concrete and wood floors, dusty concrete, spalled walls, loose pointing, and similar applications. The folder is attractively presented in four colors and is illustrated to show some of the applications referred to in the text.

(*Continued on page* 1254)

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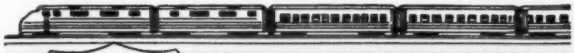

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Correctly designed, accurately forged and with a uniformly high quality maintained throughout the entire line, Warwood Track Tools are the kind that stand up under severe service. These famous tools are scientifically heat treated to meet A. R. E. A. specifications and when you specify Warwood . . . you specify Track Tools that will meet your requirements.

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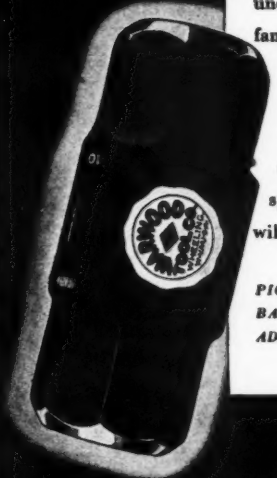
*ADZES... PUNCHES... CHISELS*



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FORGED TOOLS

*Double Faced Sledge*
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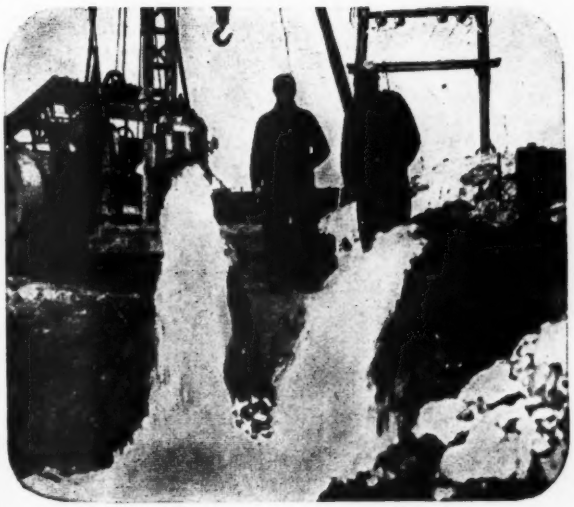
WARWOOD TOOL COMPANY
WHEELING, WEST VIRGINIA



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—Twelve miles from Sudbury, Canada in the heart of the rich nickel mining area, two newly completed Layne Well Units are now producing over 3,000 Imperial Gallons of Water per Minute. Started in weather 30 degrees below zero, the two wells were drilled, equipped, tested and delivered without delay. Both wells are electric motor powered and are providing water for the mines and for the townsite. Ore from these mines is shipped to Norway for refining.

Layne Well Water Systems are widely used throughout Canada, serving cities, mines, paper pulp mills, air fields and army camps. As is the case elsewhere, these Canadian installations are highly efficient, produce large quantities of water and are exceptionally dependable in all kinds of weather.

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**LAYNE & BOWLER, INC.**
General Offices: Memphis 8, Tennessee

• **pumps** for wells, lakes, rivers, reservoirs, irrigation —or for any use where large quantities of water must be produced at low cost. Sizes range from 40 to 16,000 gallons per minute. Write for Layne Pump Catalog.

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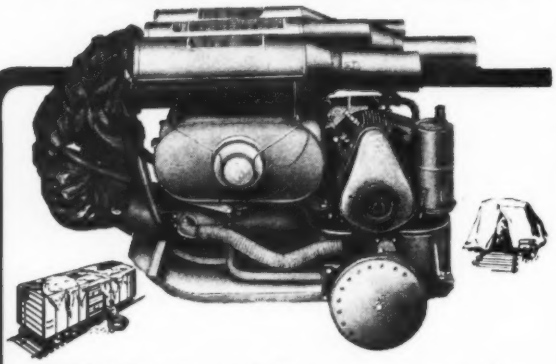
## FOR RAILROAD JOBS



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**STEWART-WARNER "Southwind"**

# PORTABLE HEATER

● Wintertime poses a lot of problems for railroads. Frozen pipes, ice on car doors and other headaches. Here's a solution . . . quick, low cost, safe heat . . . instant *torrents* of heat! Preheat refrigerator cars. Helps in thawing frozen residue on floors of cattle cars. Use it to warm up shelters, warehouses, work and tool sheds. Has scores of uses, when and where you need it.

Plant weighs 250 lbs. Can be pulled over snow with sled bottom or pulled on retractable wheels on the ground. 1½ horse power. Three flexible ducts—one 16 feet long, two 10 feet—pipe heat to any desired spots. Develops 100,000 B.T.U.'s per hour on 1¼ gal. of gasoline. Turbine blower, air cooled engine. Starts easily by pulling a cord (like outboard motor).

Army used this machine in the Arctic for most rugged below zero performance. Limited supply. All brand new and fully guaranteed. Cost government $600. While they last

**$295**

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Please ship at once, by ( ) fast freight ( ) express one Stewart-Warner PORTABLE HEATING PLANT. Enclosed find ( ) check ( ) money order for $295. Ship with transportation charges collect.

Name_____

Address_____

City_____ Zone____ State_____


(*Continued from page* 1252)

**Group Washing Equipment**—The Bradley Washfountain Company has issued a new 24-page catalog, No. 4701, which presents the complete line of Bradley washfountains, multi-stall showers, and drinking fountains. In addition the catalog contains information about the new two-person Bradley Duo washfountain and the redesigned stainless steel and enameled iron washfountains. Included also are washroom planning suggestions, specification data, and information concerning maintenance and installation costs.

**Arc-Welding Accessories**—The Metal & Thermit Corporation has just released a new catalog—Bulletin No. 120—which describes the complete line of welding accessories carried in stock at each of the company's district offices. This 16-page catalog contains information about cable connectors, cable lugs, cable splicers, cleaning tools, cover plates, eye shields, ground clamps, hammers, hand shields, helmets, holders, lenses, protective clothing, spectacles, and welding cables. Specifications, sizes, and illustrations are included.

**Strapping Tools and Equipment**—A. J. Gerrard & Co., has published two four-page pamphlets describing the company's Bulkbinder and Steelbinder, both of which are designed for binding and strapping on a wide range of materials. The text of both pamphlets, well supported with illustrations, describes details of operation and construction, and includes, in addition, information concerning steel strapping and other necessary equipment, such as seals, sealers, anchor plates, and edge protectors.

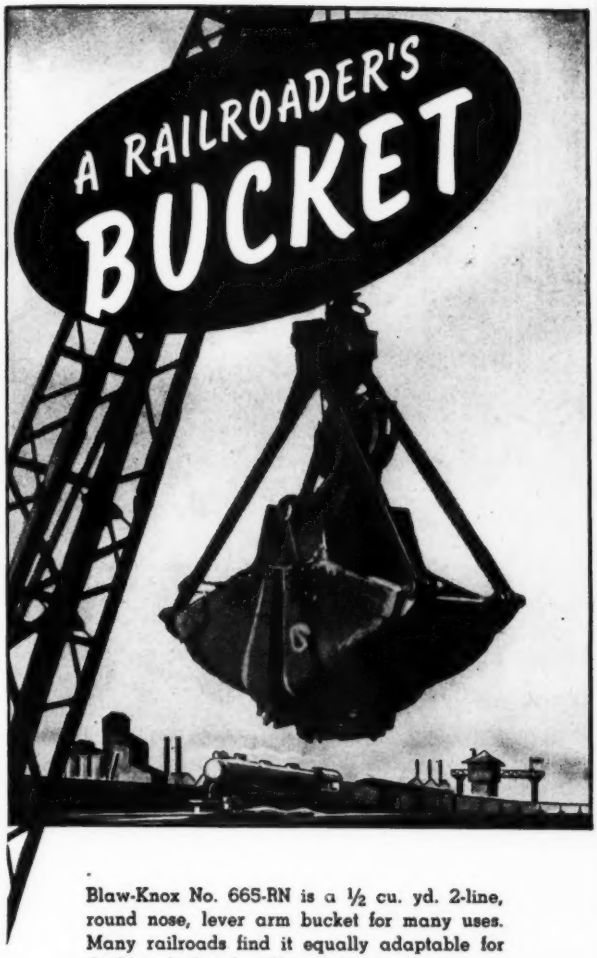
**Caterpillar Angling Blade Bulldozer**—The Caterpillar Tractor Company has announced the publication of an eight-page booklet dealing with the basic specifications and production features of the company's new cable-controlled angling blade bulldozers—the No. 8A and the No. 7A. The booklet outlines the structural advantages of these two bulldozers, which are designed for use with Caterpillar Diesel D8 and D7 track-type tractors. Well illustrated with photographs showing these machines in action, the bulletin also includes views of structural details such as blade C-frame, brace, sheave, and push cup construction and angling, and tilting and lifting adjustments.

**Onan Electric Generating Sets**—D. W. Onan & Sons, Inc., has issued a new 16-page catalog covering the company's complete line of electric plants. Attractively printed in three colors and fully illustrated, the new catalog describes electric plants ranging from 350 to 35,000 watts alternating current in all standard voltages, frequencies and phases, and direct-current plants ranging from 600 to 10,000 watts at 115 volts and from 3,500 to 10,000 watts at 230 volts. Included also is information concerning battery-charging plants in sizes ranging from 500 to 6,000 watts, at 6, 12, 24, 32 and 115 volts, and accessory equipment such as two-wheel dollies, guard frames, automatic control panels, and underground fuel tanks.

**Hauck Heaters and Thawers**—The complete line of heating and thawing equipment manufactured by the Hauck Manufacturing Company is described in a recently-issued illustrated booklet containing 16 pages. Of special interest to railroad men are the types of equipment manufactured by this company that can be used for thawing out lading in hopper cars and for melting snow and ice at switches.

**ABC's of Wrought Iron**—A 20-page illustrated booklet of this title, recently issued by the A. M. Byers Company, tells in non-technical terms what wrought iron is, why it resists corrosion and withstands shock and vibration, how it is made, and how it is bent, welded and threaded. The book also depicts the various services and applications for wrought iron in different industries, including the railroads.

**Keeping Winter in Its Place**—A new eight-page booklet, entitled Keeping Winter in Its Place With Caterpillar Diesel Equipment, has been issued by the Caterpillar Tractor Company. This booklet shows how the company's Diesel tractors and motor graders, teamed with V-type and one-way snow plows, snow wings and tractor-mounted loaders, are being used for snow-clearing operations. Profusely illustrated, this booklet is printed in color.




Blaw-Knox No. 665-RN is a ½ cu. yd. 2-line, round nose, lever arm bucket for many uses. Many railroads find it equally adaptable for ditching, ballast handling, refuse removal, coaling, etc. Like all Blaw-Knox Buckets, it gets more work done with less crane time. For a quick look at the many types and sizes of Blaw-Knox Buckets in railroad use—write today for Bulletin No. 1989.

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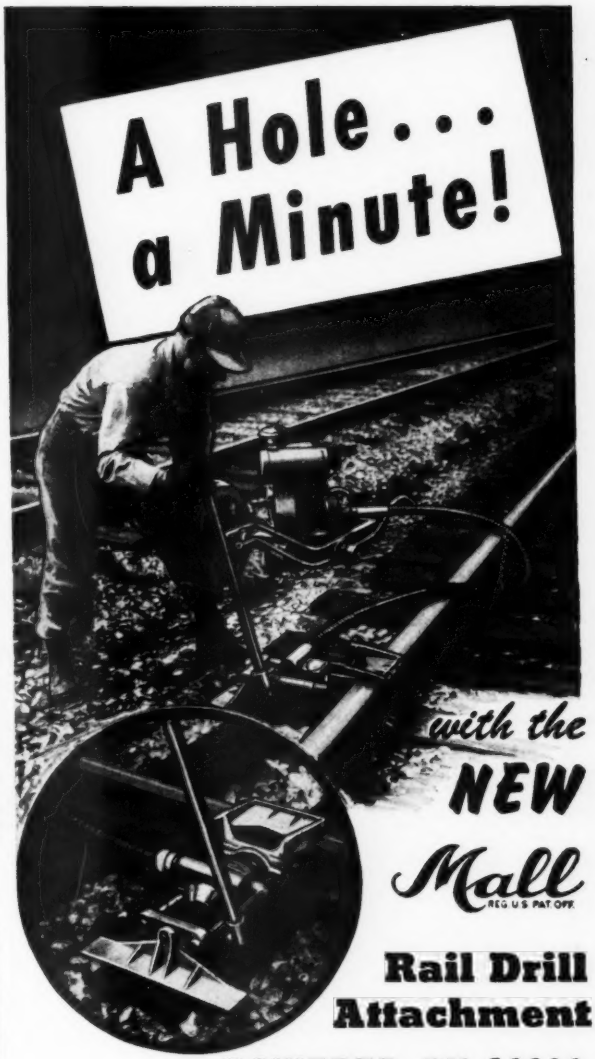


*with the* **NEW**
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***POWERED BY MALL***
GASOLINE ENGINE ***RAIL UNIT***

**Here's a new Mall Attachment that converts your Mall Rail Grinder Power Unit into a fast and accurate Rail Drill. Every feature of this Mall Rail Drill is adapted to the drilling needs of the right-of-way. It has the power to put 1-1/16" holes through 100 or 112 pound rails in less than a minute . . . it is light in weight so that it can be carried from place to place . . . it is easily removed for passing trains . . . and it is short in length to allow convenient use on narrow switch sections. It can also be used for drilling "I" beams and girder rails.**

**The Mall Rail Drill is one of many attachments for track maintenance that operate from the Mall Rail Grinder—a 6 H.P. Gasoline Engine Power Unit with a wheel barrow mounting for on or off the track use.**

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# YOU CAN CUT HEAVY TIMBERS FAST

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● This sturdy SKIL Saw cuts 4⅜ inches deep . . . rips or cross-cuts 4 inch timbers 10 times faster than by hand . . . bevel-cuts 3¼ inch lumber at 45° . . . cuts 8 inch timbers in two quick cuts. It also cuts concrete, stone, marble, terra cotta and other building materials including light gauge metals. There isn't a better saw for bridge and building gangs using air for power. Ask your SKIL Tool Distributor today for a demonstration.

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**Tamp** Backfill
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**An all-around tool, ready to go—on your regular jobs—or in an emergency.**

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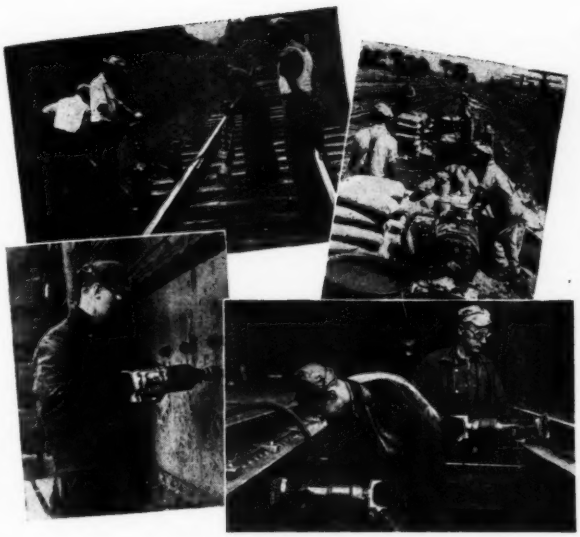
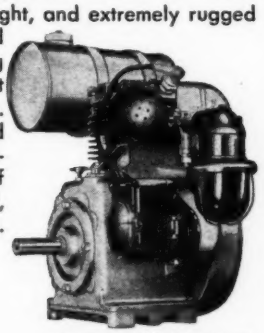
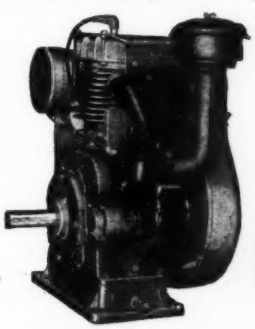


## It Takes
# WISCONSIN Engine Power
## as well as Men and Machines to Keep Rolling Stock Rolling

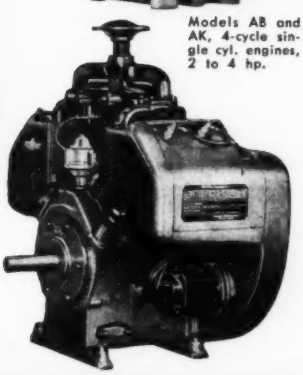
Whether the job happens to be pressure grouting the roadbed, track work with vibratory tie tampers, or shop jobs such as cleaning off old paint with pneumatic wire brushes, operating a pneumatic impact wrench, etc. . . . you will find Wisconsin Air-Cooled Engines somewhere in the background, furnishing dependable power for men and tools. Compact in design, light in weight, and extremely rugged in service, Wisconsin Air-Cooled Engines are ideal for operating a great variety of equipment within a 2 to 30 hp. power range. Trouble-free air-cooling and heavy-duty design and construction throughout are assurance of MOST H. P. HOURS OF SERVICE, with the fewest possible layups.



Models AB and AK, 4-cycle single cyl. engines, 2 to 4 hp.



Models AEH, AFH, AGH, AHH 4-cycle, single cyl., standard engines, 4 to 9 hp.



Model VE-4, V-type, 4-cyl. standard engine, 20 hp.

Most H.P. per pound

**WISCONSIN MOTOR Corporation**
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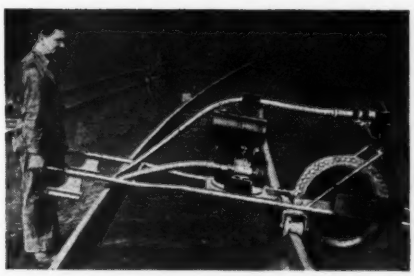
*World's Largest Builders of Heavy-Duty Air-Cooled Engines*

# EASIER, FASTER TRACK WORK with these NEW RTW MODELS



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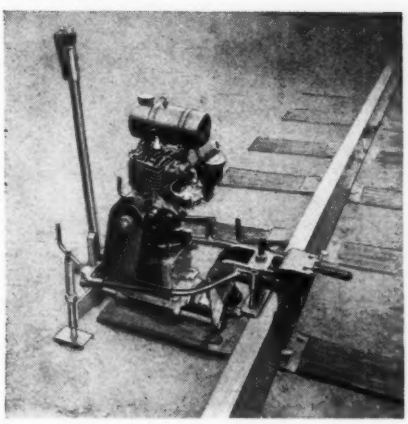
You'll like this new easier-to-handle grinder for both on- and off-track work. Transporting wheel adjusts to three positions by new, foolproof spring locking device — machine clears switches and crossovers with ease, levels quickly for off-track use, gets on and off track faster. Power-unit mounted on ball bearing turn table facilitates handling flexible shaft and attachments. Six hp. air-cooled gasoline engine or electric motor drive.



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Superb balance, light weight . . . features you'll appreciate in this new track drill. Attached and removed from rail *fast*. Quick, accurate adjustment for leveling with rail and uneven ground; adjusts to various rail sizes. Lateral feeding of drill by ratchet gear and rack simplifies operation. Holes up to 1½" in less than a minute. Motor raises or lowers on frame. V-belts well guarded.

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***No family housing available immediately; bachelor quarters can be provided.***

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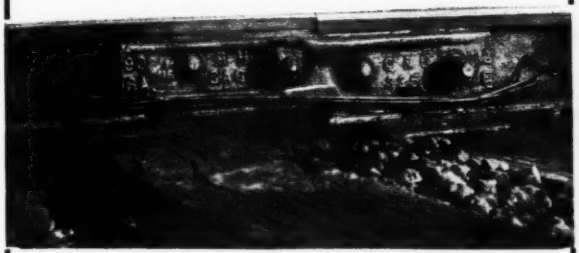
### *For Dependable Service*



Q and C Step Joints are available for all the new sections of rail. They are made of high-grade rolled and forged steel or of alloy cast steel, both heat treated to obtain maximum strength and resistance to impact.

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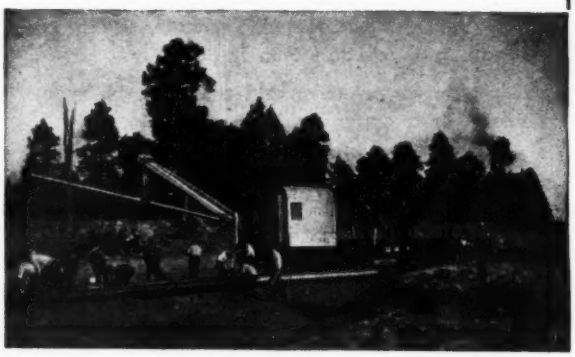

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